Vol. 1083 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

October 27, 1987

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

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CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1083 OG 40
Notice of Maintenance Fees Payable	1083 OG 40
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1083 OG 41
Reissue Applications Filed	1083 OG 42
Requests for Reexaminations Filed	1083 OG 42
Board of Patent Appeals and Interference Vacancies	1083 OG 43
Notice of Examination for Registration Wed., Apr. 13, 1988	1083 OG 43
Suspension	1083 OG 44
Service by Publication	1083 OG 44
Unpaid Fee Checks	1083 OG 44
PTO Status	1083 OG 45
Patent Certificates of Correction	1083 OG 46
Disclaimers	1083 OG 46
Disclaimer and Dedication	1083 OG 47
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1083 OG 48
Condition of Patent Applications	1083 OG 49
Reissue Patents Granted (32,528)	1677
Plant Patents Granted (6,043)	1681
Patents Granted	
General and Mechanical (4,701,962)	1683
Chemical (4,702,741)	1961
Electrical (4,703,131)	2075
Design Patents Granted (292,440)	2217
Index of Patentees	PI 1
Indices of Reissue, Design and Plant Patentees	PI 60
Classification of	
Patents (Including Reissues)	PI 63
Designs and Plants	PI 66
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 67
Designs and Plants	PI 68
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on October 23, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,477,927 through 4,479,266
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 9, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 32,120	06/572,713	4/22/86
(4,397,736)	(06/249,804)	(8/9/83)
4,397,050	06/230,670	8/9/83
4,397,051	06/259,043	8/9/83
4,397,056	06/320,659	8/9/83
4,397,061	06/233,165	8/9/83
4,397,062	06/231,474	8/9/83
4,397,065	06/262,894	8/9/83
4,397,070	06/362,418	8/9/83
4,397,089	06/228,879	8/9/83
4,397,095	06/252,627	8/9/83
4,397,097	06/313,789	8/9/83
4,397,104	06/227,831	8/9/83
4,397,108	06/225,605	8/9/83
4,397,113	06/232,669	8/9/83
4,397,115	06/299,775	8/9/83
4,397,123	06/229,312	8/9/83
4,397,128	06/234,690	8/9/83
4,397,136	06/286,515	8/9/83
4,397,149	06/263,099	8/9/83
4,397,151	06/360,884	8/9/83
4,397,154	06/348,679	8/9/83
4,397,173	06/277,746	8/9/83
4,397,186	06/243,140	8/9/83
4,397,192	06/251,454	8/9/83
4,397,193	06/251,753	8/9/83
4,397,195	06/284,094	8/9/83
4,397,197	06/219,584	8/9/83
4,397,199	06/217,540	8/9/83
4,397,206	06/270,402	8/9/83
4,397,210	06/329,964	8/9/83
4,397,211	06/335,783	8/9/83
4,397,213	06/398,985	8/9/83
4,397,218	06/219,997	8/9/83
4,397,242	06/305,945	8/9/83
4,397,248	06/266,770	8/9/83
4,397,255	06/273,825	8/9/83
4,397,269	06/293,905	8/9/83
4,397,284	06/221,928	8/9/83
4,397,285	06/283,387	8/9/83
4,397,297	06/242,601	8/9/83
4,397,299	06/254,316	8/9/83
4,397,303	06/232,573	8/9/83
4,397,309	06/236,477	8/9/83
4,397,310	06/239,015	8/9/83
4,397,312	06/274,468	8/9/83
4,397,320	06/304,609	8/9/83
4,397,321	06/295,898	8/9/83
4,397,323	06/410,133	8/9/83
4,397,326	06/360,740	8/9/83
4,397,329	06/324,660	8/9/83
4,397,338	06/317,181	8/9/83
4,397,342	06/288,043	8/9/83
4,397,346	06/268,722	8/9/83
4,397,356	06/247,918	8/9/83
4,397,362	06/240,985	8/9/83
4,397,369	06/253,691	8/9/83
4,397,370	06/272,930	8/9/83
4,397,376	06/235,289	8/9/83
4,397,381	06/325,144	8/9/83
4,397,384	06/241,425	8/9/83
4,397,394	06/399,658	8/9/83
4,397,403	06/303,395	8/9/83
4,397,405	06/308,779	8/9/83
4,397,419	06/230,584	8/9/83
4,397,420	06/410,514	8/9/83
4,397,421	06/291,436	8/9/83
4,397,422	06/270,329	8/9/83
4,397,430	06/230,117	8/9/83
4,397,434	06/342,995	8/9/83
4,397,435	06/332,649	8/9/83
4,397,438	06/226,303	8/9/83
4,397,439	06/234,231	8/9/83
4,397,441	06/286,258	8/9/83
4,397,442	06/223,669	8/9/83
4,397,453	06/354,896	8/9/83
4,397,462	06/277,930	8/9/83
4,397,463	06/377,521	8/9/83
4,397,466	06/301,831	8/9/83
4,397,476	06/233,127	8/9/83
4,397,477	06/251,705	8/9/83
4,397,480	06/282,682	8/9/83
4,397,481	06/283,926	8/9/83
4,397,489	06/219,816	8/9/83
4,397,492	06/296,641	8/9/83
4,397,498	06/285,972	8/9/83
4,397,499	06/241,579	8/9/83

Patent Number	Serial Number	Issue Date
4,397,500	06/232,909	8/9/83
4,397,502	06/233,004	8/9/83
4,397,503	06/272,087	8/9/83
4,397,508	06/232,416	8/9/83
4,397,509	06/247,729	8/9/83
4,397,515	06/243,815	8/9/83
4,397,532	06/264,418	8/9/83
4,397,539	06/333,505	8/9/83
4,397,547	06/238,468	8/9/83
4,397,548	06/217,335	8/9/83
4,397,549	06/248,629	8/9/83
4,397,561	06/262,754	8/9/83
4,397,568	06/250,974	8/9/83
4,397,580	06/323,728	8/9/83
4,397,582	06/249,580	8/9/83
4,397,585	06/227,237	8/9/83
4,397,588	06/227,545	8/9/83
4,397,590	06/259,476	8/9/83
4,397,593	06/230,377	8/9/83
4,397,600	06/252,953	8/9/83
4,397,601	06/222,927	8/9/83
4,397,607	06/341,732	8/9/83
4,397,626	06/251,970	8/9/83
4,397,630	06/255,862	8/9/83
4,397,641	06/250,534	8/9/83
4,397,646	06/247,100	8/9/83
4,397,655	06/267,199	8/9/83
4,397,665	06/339,964	8/9/83
4,397,686	06/224,163	8/9/83
4,397,687	06/380,795	8/9/83
4,397,700	06/351,711	8/9/83
4,397,701	06/236,529	8/9/83
4,397,705	06/352,387	8/9/83
4,397,710	06/341,860	8/9/83
4,397,717	06/233,170	8/9/83
4,397,721	06/347,974	8/9/83
4,397,728	06/216,422	8/9/83
4,397,753	06/420,482	8/9/83
4,397,754	06/305,262	8/9/83
4,397,762	06/343,249	8/9/83
4,397,775	06/269,225	8/9/83
4,397,778	06/223,547	8/9/83
4,397,786	06/324,207	8/9/83
4,397,787	06/340,443	8/9/83
4,397,815	06/297,410	8/9/83
4,397,829	06/351,750	8/9/83
4,397,834	06/337,339	8/9/83
4,397,840	06/354,302	8/9/83
4,397,845	06/379,529	8/9/83
4,397,849	06/329,862	8/9/83
4,397,850	06/309,255	8/9/83
4,397,862	06/310,554	8/9/83
4,397,871	06/303,904	8/9/83
4,397,874	06/251,276	8/9/83
4,397,884	06/323,075	8/9/83
4,397,887	06/409,010	8/9/83
4,397,891	06/363,562	8/9/83
4,397,925	06/311,537	8/9/83
4,397,942	06/314,180	8/9/83
4,397,947	06/273,145	8/9/83
4,397,950	06/324,246	8/9/83
4,397,953	06/235,134	8/9/83
4,397,955	06/247,259	8/9/83
4,397,956	06/329,392	8/9/83
4,397,964	06/322,679	8/9/83
4,397,979	06/289,618	8/9/83
4,397,983	06/334,593	8/9/83
4,397,986	06/354,468	8/9/83
4,397,987	06/422,063	8/9/83
4,397,997	06/318,251	8/9/83
4,398,012	06/336,976	8/9/83
4,398,025	06/337,649	8/9/83
4,398,028	06/277,054	8/9/83
4,398,030	06/341,951	8/9/83
4,398,033	06/355,498	8/9/83
4,398,038	06/396,290	8/9/83
4,398,055	06/295,072	8/9/83
4,398,058	06/245,143	8/9/83
4,398,065	06/341,655	8/9/83
4,398,076	06/241,229	8/9/83
4,398,086	06/337,229	8/9/83
4,398,096	06/284,601	8/9/83
4,398,097	06/343,048	8/9/83
4,398,111	06/357,096	8/9/83
4,398,120	06/252,808	8/9/83
4,398,125	06/316,542	8/9/83
4,398,129	06/276,748	8/9/83
4,398,130	06/355,658	8/9/83
4,398,137	06/250,702	8/9/83
4,398,139	06/236,971	8/9/83
4,398,145	06/217,150	8/9/83
4,398,148	06/230,706	8/9/83
4,398,150	06/231,213	8/9/83
4,398,157	06/258,432	8/9/83
4,398,161	06/253,453	8/9/83
4,398,184	06/280,298	8/9/83
4,398,185	06/223,439	8/9/83
4,398,188	06/309,443	8/9/83
4,398,197	06/301,088	8/9/83
4,398,204	06/296,971	8/9/83
4,398,212	06/297,519	8/9/83
4,398,214	06/279,664	8/9/83
4,398,237	06/341,203	8/9/83
4,398,293	06/300,363	8/9/83
4,398,295	06/269,899	8/9/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,431,129, Re. S.N. 023,846, Filed Mar. 9, 1987, Cl. 229/151, FOLDING ICE-CREAM CARTON, CARTON BLANK, AND METHOD, Thomas W. Froom, Owner of Record: *Great Lakes Press Corp., Rochester, N.Y.,* Attorney or Agent: B. Edward Shlesinger, Ex. Gp.: 241

4,546,048, Re. S.N. 047,238, Filed May 7, 1987, Cl. 428/460, COMPOSITE THERMAL SHIELD FOR ENGINE COMPONENTS, William D. Guenther, Owner of Record: *Dana Corp., Toledo, Ohio,* Attorney or Agent: Frank B. McDonald, Ex. Gp.: 154

4,554,487, Re. S.N. 087,330, Filed Aug. 3, 1987, Cl. 315/224, ELECTRONIC FLUORESCENT LAMP BALLAST WITH OVERLOAD PROTECTION, Ole K. Nilssen, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 266

4,575,032, Re. S.N. 096,920, Filed Sept. 14, 1987, Cl. 248/1, ROCK CLIMBING ADJUSTABLE CHOCK, Peter C. Taylor, Owner of Record: *Inventor,* Attorney or Agent: Robert E. Wickersham, Ex. Gp.: 355

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,075,491, Reexam. No. 90/001,333, Requested: Sept. 21, 1987, Cl. 378/19, POSITION SENSITIVE X-RAY OR Y-RAY DETECTOR AND 3-D TOMOGRAPHY USING SAME, Douglas P. Boyd, Owner of Record: *The Board of Directors of Leland Stanford Jr. University,*

Stanford, Calif., Attorney or Agent: Fler, Hohbach, et al., Ex. Gp.: 250, Requester: Owners

4,162,338, Reexam. No. 90/001,338, Requested: Sept. 23, 1987, Cl. 427/249, COATED CEMENTED CARBIDE ELEMENTS AND THEIR MANUFACTURE, Wilfried Schintlmeister, Owner of Record: *Schwarzkopf Development Corp., New York, N.Y.*, Attorney or Agent: Morgan, Finnegan, et al., Ex. Gp.: 150, Requester: Harness, Dickey, et al., Bloomfield Hills, Mich.

4,367,060, Reexam. No. 90/001,335, Requested: Sept. 25, 1987, Cl. 311/303, METHOD FOR MAKING A SEAL NUT, Imre Berecz, Owner of Record: *Microdot, Inc., Greenwich, Conn.*, Attorney or Agent: Lymon R. Lyon, Ex. Gp.: 350, Requester: Bristol Ind., Brea, Calif.

4,568,988, Reexam. No. 90/001,337, Requested: Sept. 28, 1987, Cl. 360/77, MICRO HARD-DISK DRIVE SYSTEM, James G. McGinlay, et al., Owner of Record: *Rodime PLC, Glenrothes Fife, Scotland*, Attorney or Agent: Unknown, Ex. Gp.: 230, Requester: Owner

4,638,383, Reexam. No. 90/001,339, Requested: Sept. 28, 1987, Cl. 360/77, MICRO HARD-DISK DRIVE SYSTEM, James G. McGinlay, et al., Owner of Record: *Rodime PLC, Glenrothes Fife, Scotland*, Attorney or Agent: Unknown, Ex. Gp.: 230, Requester: Owner

4,668,446, Reexam. No. 90/001,334, Requested: Sept. 22, 1987, Cl. 264/1.700, PROCESS FOR MAKING SOFT CONTACT AND INTRAOCULAR LENSES WITH AN ESTERIFIABLE CARBOXYL-CONTAINING POLYMER, David G. Kaplan, et al., Owner of Record: *Cilco, Inc., Bellevue, Wash.*, Attorney or Agent: Paul E. Krieger, Ex. Gp.: 130, Requester: Owner

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Patent and Trademark Office
Board of Patent Appeals and Interferences Vacancies

The Board of Patent Appeals and Interferences will be filling a number of Examiner-in-Chief vacancies over the next several months. Positions are available in chemical, electrical, and mechanical technologies. Persons interested in being considered for these vacancies are invited to submit individual applications for each of the following vacancy announcements:

PTO–87–A6–chemical technology, PTO–87–A7–electrical technology, and PTO–87–A8–mechanical technology. There is no deadline for submitting applications. However, candidates are urged to apply as soon as possible since applications will be accepted only until the positions are filled.

Excerpts from the vacancy announcements describing the duties of the position, qualification requirements, factors to be used in evaluating candidates, and necessary application materials are listed below.

Duties: Serves as a member of the Board of Patent Appeals and Interferences of the Patent and Trademark Office. As an Examiner-in-Chief, participates in the Board's appellate and administrative responsibilities and exercises independent judgment on all matters before him/her on appeal, subject to administrative and policy direction of the Commissioner, and may be responsible for conducting interlocutory proceedings in interference and for determining questions of priority of invention and patentability between interference parties. Appeals filed in accordance with 35 USC 134 and interferences declared in accordance with 35 USC 135 involve complex legal and technical questions. The Board of Patent Appeals and Interferences has the sole power to:

(1) hear and adjudicate appeals from decisions of the Primary Examiners as to patentability in applications for patents, for reissue of patents, and for reexamination of patents;
(2) to declare and to conduct proceedings in interferences; and
(3) to determine priority of invention.

Final decisions of the Board, if unfavorable to an applicant, or to a party to an interference, may be appealed to the United States Court of Appeals for the Federal Circuit or civil action may be taken in accordance with 35 USC 145, or 35 USC 146.

Qualification requirements: In addition to a technical degree, candidates must possess:

(1) A minimum of five years of comprehensive patent experience of which at least two years involved the exercise of independent judgment in a responsible position as typified by the exercise of Full Signatory Authority as a Patent Examiner or by comparable experience in some other position inside or outside the Patent and Trademark Office;
(2) A law degree and membership in good standing of the bar in any state, D.C., Puerto Rico, or any territorial court under the Constitution;
(3) A high degree of demonstrated competence in chemical, electrical, or mechanical technology;
(4) A high degree of demonstrated competence and knowledge of interference law and practice;
(5) Demonstrated ability to determine whether or not tests which are submitted in evidence are technically sufficient to prove the question at hand;
(6) Demonstrated ability to write clearly, and to write logically developed opinions;
(7) Demonstrated ability to use legal and technical background to evaluate testimony of witnesses;
(8) Demonstrated ability to deal effectively with people within and outside the Patent and Trademark Office; and
(9) Comprehensive experience in patent prosecution, examination, or administration which demonstrates a thorough knowledge and application of patent laws and rules of practice.

Factors which will be considered in evaluating qualified candidates: Candidates will be evaluated on the total range of their education, training and experience as well as supervisory appraisals and questionnaire responses.

Interested candidates should submit the following:

(1) Personal Qualifications Statement, SF–171;
(2) Merit Program Interest Statement, CD–261 (PTO employees only);
(3) Current supervisory appraisal on your agency's form or on CD–362 (letters of reference for outside candidates);
(4) Annual narrative performance rating, or equivalent;
(5) Examiner-in-Chief Questionnaires; and
(6) Samples which evidence your writing ability.

Questions concerning this notice and requests for application materials should be directed to Ms. Suzanne Waddill, Office of Personnel, One Crystal Park, Suite 700, Arlington, Va., telephone (703) 557–3631.

DONALD W. PETERSON,
Feb. 3, 1987. *Deputy Assistant Secretary and Deputy Commissioner or Patents and Trademarks.*

Notice of Examination for Registration
Wed., Apr. 13, 1988

Pursuant to the provisions of 37 C.F.R. §§10.5, 10.6 and 10.7, an examination for persons seeking registration before the United States Patent and Trademark Office as

patent attorneys and agents will be held on *Wed., Apr. 13, 1988*. The deadline for filing applications along with the $250 fee and all necessary showings required by 37 CFR §§10.7(a) and (b) is *Jan. 31, 1988*.

With the exception of those persons who actively served four years or more in the examining corps of the Patent and Trademark Office for whom the examination is waived, all persons recognized for practice before the Patent and Trademark Office in patent cases must, pursuant to the noted rules, pass the examination. Note: those passing the examination do not qualify for recognition for practice before the Patent and Trademark Office in trademark cases. Recognition for practice in trademark cases is governed by 37 C.F.R. §10.14, which does not require the passing of an examination.

Any candidate who has failed to pass the examination after *three* opportunities and who desires to retake the examination a fourth time must submit with his or her application an affidavit giving a list of the studies pursued by him or her since the last examination, and the time occupied with them together with a certificate by the person under whose direction he or she has studied, showing that the candidate has so studied during a period of at least one year.

Any candidate who has failed to pass the examination after *four* opportunities and who desires to retake the examination for a fifth time must submit an affidavit with his or her application giving a list of studies pursued by him or her since the last examination, and the time occupied with them together with a certificate by the person under whose direction he or she has studied, showing that the candidate has so studied during a period of at least one year. The showing for admission to the fifth examination must be different from and more extensive than that for the fourth examination and must establish to the satisfaction of the Director of Enrollment and Discipline that the studies pursued by the candidate will more likely result in the candidate passing the examination.

Any candidate who has failed to pass the examination after *five* opportunities and who desires to retake the examination again will not be permitted to retake the examination unless admission to the examination is granted by the Director of Enrollment and Discipline upon written request by the candidate establishing extraordinary circumstances which would justify the candidate's admission.

Any officer or employee of the United States government who passes the examination, but whose official duties *do not* require the preparation and prosecution of applications for patent, will be endorsed as inactive on the register of attorneys and agents. (18 U.S.C. §§203 and 205).

Under 37 CFR §10.7(b), persons seeking registration must submit "satisfactory proof of good moral character and repute and of sufficient basic training in scientific and technical matters. . . ." The initial submissions of many persons not having degrees in physics, chemistry and engineering are usually inadequate, and often must be supplemented before such persons are approved to take an examination. To afford adequate time to present a satisfactory supplemental showing, it is recommended that persons file their applications early, preferably *at least two months* before the Jan. 31, 1988 deadline. Supplemental showings of qualifikations and applications received after Jan. 31, 1988 will be considered only in connection with admission to the next succeeding examination.

The examination will be given under the supervision of the Office of Personnel Management and may be taken at specific locations in which the Office of Personnel Management conducts this examination.

Application blanks may be obtained from the Office of Enrollment and Discipline, Suite 810, Crystal Park 1, 2011 Crystal Dr., Arlington, Va. or by mail addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, and directed to the attention of the Office of Enrollment and Discipline.

CAMERON WEIFFENBACH,
Director, Office of Enrollment and Discipline.

Sept. 16, 1987.

Suspension

Edwin H. Crabtree of Wichita, Kans., whose registration number is 26,720, has been suspended for a period of three years commencing on Aug. 11, 1986, when he surrendered voluntarily to the designated institution to which he was sentenced for a three year period of incarceration. This action is taken under the provisions of 35 U.S.C. 32, and 37 CFR 10.130 and 10.133(g).

CAMERON WEIFFENBACH,
Director, Office of Enrollment and Discipline.

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an appearance within thirty days of this publication, the cancellation will be proceeded with as in the case of default.

Knickerbocker Toy Co., Inc., Middlesex, N.J., Reg. No. 1,307,597, for the mark "CRAYON", Canc. No. 15,986.

ERMA S. BROWN,
Administrator of the Trademark Trial and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner for Trademarks.

Unpaid Fee Checks

Beginning Dec. 1, 1987, the Office will change the procedure for handling fee checks of attorneys and agents that are returned to the Office unpaid. Presently, when a check submitted as payment for an application, a processing, an issue or any other fee is returned to the Office unpaid, the Office of Finance sends a letter to the attorney or agent who represents the applicant, or to the applicant if unrepresented by an attorney or agent, enclosing the check and calling attention to the fact that the check was returned unpaid. Beginning Dec. 1, 1987, the Office of Finance will send a copy of its letter to the applicant if the letter is addressed to an attorney or agent. The prohibition of 37 CFR §§1.33 and 2.18 against double correspondence is waived in view of the submission of a check that is returned unpaid to the Office.

A registered patent attorney or agent who repeatedly submits checks that are returned unpaid through no fault of the bank may expect to have the matter referred to the Office of Enrollment and Discipline.

DONALD W. PETERSON,
Deputy Commissioner.

Oct. 5, 1987.

Status of PTO Services

The following is an update of the status of PTO services for September 1987:

Service Item	FY 1987 Goal (Calendar Days*)	Monthly Average (Calendar Days*)
Filing Receipts:		
Patents	22	27
Trademarks	30	64**
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	1
Mail Coupons	12	4
Letter Orders	16	10
Certified Copies:		
Trademark Registrations	21	21
Applications-As-Filed	17	17***
File-Wrapper/Contents	N/A	23
Walk-up Certification	1	2
Trademark Search Library:		
Filing Pending Marks	21	49
Filing Reg. Certificates	Issue Date	Issue Date
Assignments:		
Patents	20	45 (see narrative)
Trademarks	20	26
Receipt Date of Trademark Documents Returned		Sept. 2, 1987
Receipt Date of Patent Documents Returned		Aug. 10, 1987
Avg. Days from Issue Fee Payment to Issue Date	90–100	86
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On schedule
Patent Copies Available	95% on Issue Date	86% on Issue Date****
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Keying contractor delays.
*** The 5% of orders for which fiche are not on site are not included in calculations.
**** Printer delivered copies late.

IMPROVEMENTS TO SERVICES

- The increase in the days to process patent assignments reflects the working off of a large backlog of old assignments which involved more than 99 properties. This backlog has now been eliminated and all patent assignments should be back on target in October.

Oct. 2, 1987.

THERESA A. BRELSFORD,
Assistant Commissioner
for Administration.

Certificates of Correction for the Week of Oct. 27, 1987

D. 289,824	4,638,548	4,660,681	4,670,143
4,443,456	4,639,204	4,660,895	4,670,150
4,485,917	4,642,809	4,661,011	4,670,258
4,512,606	4,642,995	4,661,472	4,670,277
4,520,113	4,643,218	4,661,503	4,670,385
4,537,204	4,643,243	4,661,900	4,670,574
4,550,516	4,644,479	4,662,173	4,670,906
4,556,418	4,644,541	4,662,485	4,671,127
4,563,110	4,644,678	4,663,236	4,671,162
4,563,717	4,645,495	4,663,733	4,671,331
4,581,214	4,645,786	4,664,108	4,671,359
4,584,287	4,645,887	4,664,260	4,671,859
4,587,896	4,645,991	4,664,339	4,671,900
4,592,639	4,646,081	4,664,569	4,672,256
4,592,822	4,647,432	4,664,594	4,672,305
4,594,982	4,647,699	4,664,873	4,672,432
4,595,982	4,648,821	4,664,926	4,672,667
4,597,896	4,648,905	4,665,075	4,672,705
4,598,154	4,649,037	4,665,270	4,672,834
4,599,268	4,649,264	4,665,382	4,673,389
4,611,890	4,649,522	4,665,509	4,673,679
4,613,424	4,652,487	4,665,543	4,673,731
4,619,639	4,654,022	4,665,649	4,673,822
4,621,089	4,654,077	4,665,687	4,674,138
4,621,279	4,654,115	4,665,733	4,674,696
4,621,598	4,654,393	4,666,329	4,674,952
4,624,625	4,654,845	4,667,345	4,676,265
4,624,902	4,655,649	4,667,649	4,676,324
4,628,628	4,655,784	4,667,707	4,676,498
4,629,682	4,655,806	4,667,791	4,676,946
4,630,058	4,656,824	4,667,824	4,677,149
4,630,217	4,657,189	4,668,607	4,677,255
4,630,311	4,657,284	4,668,650	4,677,356
4,630,468	4,657,769	4,669,191	4,677,832
4,631,832	4,659,009	4,669,572	4,677,918
4,635,187	4,659,031	4,669,590	4,678,222
4,635,562	4,659,120	4,669,750	4,679,048
4,636,564	4,660,077	4,669,822	4,679,582
4,637,333	4,660,420	4,669,862	4,680,131
4,637,534	4,660,550	4,669,960	4,685,106
4,637,974	4,660,577	4,669,977	

Disclaimers

3,979,437.—*Robert J. Theissen*, Westfield, N.J. SUBSTITUTED PHENOXYBENZOIC ACIDS DERIVATIVES THEREOF. Patent dated Sept. 7, 1976. Disclaimer filed Feb. 9, 1979, by the assignee, *Mobil Oil Corp.*

The term of this patent subsequent to Mar. 28, 1989, has been disclaimed.

B1. 4,168,851.—*Per W. Halse*, Oslo, Norway. CONTINUOUS BUSINESS FORMS ASSEMBLY. Patent dated Sept. 25, 1979. Disclaimer filed Oct. 21, 1986, by the assignee, *Moore Business Forms, Inc.*

The term of this patent subsequent to Sept. 12, 1995, has been disclaimed.

4,271,140.—*James R. Bunting*, Washington, D.C. METHOD AND COMPOSITION FOR DOUBLE RECEPTOR, SPECIFIC BINDING ASSAYS. Patent dated June 2, 1981. Disclaimer filed Aug. 3, 1987, by the assignee, *Baxter Travenol Laboratories, Inc.*

Hereby enters this disclaimer to claims 30, 31, 32 and 37 of said patent.

4,271,216.—*Hiromichi Shimizu*, Sagamihara, Japan. METHOD FOR COATING A CYLINDRICAL CAN BODY. Patent dated June 2, 1981. Disclaimer filed July 6, 1987, by the assignee, *Daiwa Can Co., Ltd.*

Hereby enters this disclaimer to the remaining term of said patent.

4,486,227.—*Michel Douchy*, Solesmes, *Jean-Louis Tranchant*, Valenciennes, *Michel Jehan*, La Flamengrie, France. MANUFACTURE OF A COMPOSITE TUBULAR PRODUCT. Patent dated Dec. 4, 1984. Disclaimer filed June 9, 1987, by the assignee, *Vallourec.*

The term of this patent subsequent to Aug. 4, 2001, has been disclaimed.

4,511,308.—*Bruce A. Russell*, Queenscliffe and *Adnan M. Abdel-Fattah*, Blacktown, Australia. AXIAL AND MIXED FLOW FANS AND BLOWERS. Patent dated Apr. 16, 1985. Disclaimer filed Aug. 10, 1987, by the assignee, *James Howden Australia Pty. Ltd.*

Hereby enters this disclaimer to claims 1 to 9 of said patent.

4,580,534.—*Randall B. Blum*, Peoria and *Raymond O. Starnes*, Chillicothe, Ill. ENGINE BARRING DEVICE. Patent dated Apr. 8, 1986. Disclaimer filed Aug. 10, 1987, by the assignee, *Caterpillar, Inc.*

Hereby enters this disclaimer to all claims of said patent.

4,587,252.—*John D. Arnold*, Kansas City, Mo. HYDROCODONE/IBUPROFEN PHARMACEUTICAL COMPOSITIONS AND METHOD. Patent dated May 6, 1986. Disclaimer filed July 27, 1987, by the assignee, *John D. Arnold.*

The term of this patent subsequent to Feb. 18, 2003, has been disclaimed.

4,622,819.—*Robert Draper*, Churchill Boro, Pa., *George J. Silvestri, Jr.*, Winter Park and *Homer G. Hargrove*, Maitland, Fla. STEAM TURBINE EXHAUST PIPE EROSION PREVENTION SYSTEM. Patent dated Nov. 18, 1986. Disclaimer filed Aug. 26, 1987, by the assignee, *Westinghouse Electric Corp.*

The term of this patent subsequent to July 29, 2003, has been disclaimed.

4,650,536.—*Arcangelo B. Ceraso*, Milano, Italy. MACHINE FOR APPLYING A PORTION OF PHOTOSENSITIVE FILM TO AT LEAST ONE FACE OF A FLAT PLATE HAVING A SURFACE AREA GREATER THAN SAID PORTION. Patent dated Mar. 17, 1987. Disclaimer filed Sept. 2, 1987, by the assignee, *Morton Thiokol A.p.A.*

Hereby enters this disclaimer to claim 19 of said patent.

Disclaimer and Dedication

4,231,114.—*Arman Vahe Dolikian*, Palatine, Ill. SYNCHRONIZING MEANS FOR A TWO-WAY COMMUNICATION SYSTEM. Patent dated Oct. 28, 1980. Disclaimer and Dedication filed July 20, 1987, by the assignee, *Motorola, Inc.*

Hereby disclaims and dedicates to the Public all claims of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4222
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF September 12, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-13-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	12-27-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-22-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	9-30-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-18-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-25-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	5-28-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during September 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,526,004 to 3,531,805, inclusive

Plant Patents . . . . . Numbers 2,989 to 2,990 inclusive

REISSUES

OCTOBER 27, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,528
CONTAINER FOR PICTURES HAVING SIMILAR FORMATS

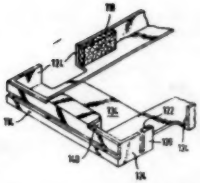
Peter Ackeret, Kusnacht, Switzerland, assignor to Licinvest AG, Chur, Switzerland

Original No. 4,458,434, dated Jul. 10, 1984, Ser. No. 285,153, Jul. 20, 1981. Continuation-in-part of Ser. No. 138,641, Apr. 8, 1980, Pat. No. 4,376,348. Application for reissue Jun. 23, 1986, Ser. No. 877,496

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1979, 2914351

Int. Cl.[4] G09F *11/30*

U.S. Cl. 40—513 **23 Claims**



1. Container having a substantially rectangular outline for the accommodation of a pile of pictures of similar formats, consisting essentially of two parts which can be moved relative to one another and which, when in an open position, permit the pile to be removed, one of the parts comprising a housing having an upper and lower shell united together and having a transparent viewing window with edges in the upper shell, the other of the parts comprising a slider member which is slidable into the housing in a direction parallel with the viewing window, the parts in a closed position of the container, having a format similar to that of the piled pictures the uppermost of which is presented at the viewing window, the container having outer edges defining the outer perimeter of the container in closed condition, [all viewing window edges being at substantially equal distances from the outer edges of the container so that the viewing window is framed substantially equally at all edges thereof by border surface portions of the container,] the container having picture engaging centering elements therein at locations spaced [substantially equally] inwardly from all perimeter edges of the container in closed condition and by means of which, when the container is closed, at least all the edges of the uppermost picture are aligned with respect to the viewing window edges, said viewing window having dimensions substantially equal to those of said pictures, and said centering elements being disposed substantially perpendicular to said viewing window plane and coincident with the outline thereof for maintaining the entire uppermost picture within the viewing window.

Re. 32,529
PROCESS FOR THE ELECTROMAGNETIC CASTING OF METALS INVOLVING THE USE OF AT LEAST ONE MAGNETIC FIELD WHICH DIFFERS FROM THE FIELD OF CONFINEMENT

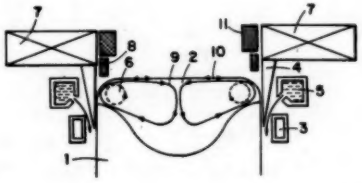
Charles Vives, Chateaurenard, France, assignor to Aluminum Pechiney, France

Original No. 4,530,404, dated Jul. 23, 1985, Ser. No. 511,397, Jul. 7, 1983. Application for reissue May 21, 1986, Ser. No. 865,375

Claims priority, application France, Jul. 23, 1982, 82 13220

Int. Cl.[4] B22D *27/02*

U.S. Cl. 164—467 **7 Claims**



1. In a process for the electromagnetic casting of metals wherein an electromagnetic confinement field acts on molten metal in the course of solidification to contain and form said molten metal into a desired casting, the improvement comprising the steps of applying a stationary field to said molten metal, said stationary field being generated by an annular coil supplied with direct current, and simultaneously applying a variable field to said molten metal, said variable field being generated by an annular coil supplied with alternating current, said fields being applied to the molten metal to produce radial vibrations within the metal during solidification and to limit the agitation of the molten metal, thereby improving the structure and surface condition of the cast metal.

Re. 32,530
SHIPPING PALLET

Bryant W. Cantey, Jr., 2111 Cleveland St., Greenville, S.C. 29607

Original No. 4,482,051, dated Nov. 13, 1984, Ser. No. 382,151, May 26, 1982. Application for reissue Mar. 15, 1985, Ser. No. 712,251

Int. Cl. B65D *71/00*

U.S. Cl. 206—392 **1 Claim**

1. A pallet for use in shipping a plurality of similarly shapped articles, comprising:

a plurality of elongated article support members each comprising,

a centrally outwardly extending flange;

an article locator at each end of said support member; and

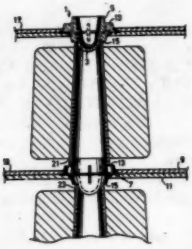
a ledge area extending laterally from said flange *at one end of said support member* and being of less diameter than said flange and of greater diameter than said article locator;

at least two layers of crushable rigid material for entrapping said flange area of said article support member therebetween, said flange area thus being between said upper and lower planar surfaces of said rigid material; *and*

wherein said other end of each of said support members includes means to support one of said articles and prevent said articles from contacting and crushing said rigid material;

and wherein said ledge [member] *area* extends beyond the

planar surface of at least one surface of said rigid material for support of an article thereon and to prevent said article



from contacting and crushing said rigid material and wherein said article locator lies within the perimeter of said ledge area.

Re. 32,531

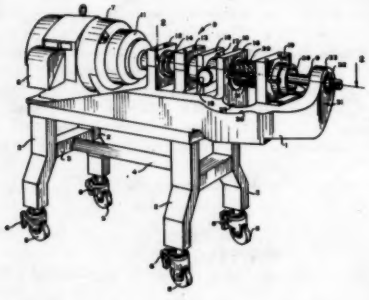
DEBONING APPARATUS AND METHOD

Nicholas R. Beck, Atlanta; Gordon C. Leonard, Dalton, and Jack A. Prince, Gainesville, all of Ga., assignors to The Kartridg Pak Co., Davenport, Iowa

Original No. 4,042,176, dated Aug. 16, 1977, Ser. No. 6,72,,317, Mar. 31, 1976. Application for reissue Aug. 10, 1979, Ser. No. 65,567

Int. Cl.[4] B02C *23/16*

U.S. Cl. 241—24 **34 Claims**



33. In a de-boning machine having an auger, a barrel in which said auger is rotatable and having a rear feed inlet end and a front discharge end, rigid support means for mounting said barrel and supporting said barrel at least adjacent both said rear feed inlet and said front discharge end, bearings, supporting said auger for substantially vibration-free co-axial high speed rotation within said barrel when driven at speeds of at least about 550 rpm, power means connected in driving relationship with said auger for rotating the same at speeds of at least about 500 rpm, means for feeding material to be de-boned into said rear feed inlet end of said barrel, and valve means providing a restricted annular discharge orifice for de-meated bone material adjacent said front discharge end,

said barrel comprising an imperforate cylindrical section extending forwardly from said inlet end thereof and a perforated cylindrical section extending forwardly from said imperforate cylindrical section to said discharge end, the perforations in said perforated cylindrical section being small enough to prevent passage therethrough of bone particles of appreciable size,

said auger having a pressurizing section housed within said imperforate cylindrical section and a conveying section housed within said perforated cylindrical section, said pressurizing section having a helical vane or flight the radial depth of which decreases substantially from adjacent said rear feed inlet end of said imperforate cylindrical section to the front end thereof, and said conveying section having a helical vane or flight the radial depth of which ranges from substantial uniformity to a slight decrease toward said front discharge end of said perforated cylindrical section, and

said valve means comprising a valve sleeve and means for supporting said sleeve co-axially juxtaposed in front of said perforated cylindrical section with a space between the front end of said auger conveying section and the rear inlet end of said valve sleeve providing said restricted annular discharge orifice,

there being a radial clearance of at least about 0.005 inch between the outside diameter of the vane or flight on said conveying section of said auger and the interior of said perforated cylindrical section of said barrel, and in operation

the boney content of the material being agitated and ground together as it is conveyed through said perforated cylindrical section of said barrel thereby releasing meat therefrom and said restricted annular orifice furnishing back pressure upon the boney material conveyed thereto.

Re. 32,532

PIPELAYING APPLIANCE

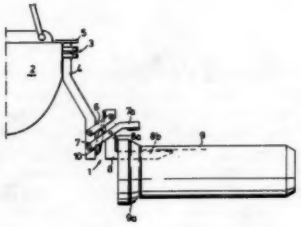
John T. Sonerud, Vintervagen 30, S-824 00 Hudiksvall, Sweden

Original No. 4,515,522, dated May 7, 1985, Ser. No. 459,118, Jan. 19, 1983. Application for reissue Dec. 15, 1986, Ser. No. 941,686

Claims priority, application Sweden, Jan. 22, 1982, 8200365-8

Int. Cl.[4] E02F *5/00*

U.S. Cl. 414—747 **6 Claims**



1. A pipelaying appliance, connected to a raisable and lowerable apparatus such as an excavator or a crane, and including a gripping means for removable engagement with a pipe, said means comprising a first member projecting into the pipe and an opposing second member on the outside of said pipe, said first and second members being movable to and from each other and connected to said appliance so that the clamping force provided by said first and second members on the wall of said pipe will be proportional to the weight of said pipe carried by said gripping means, characterized by a spring means exerting a force on both said first and second members for the mutual displacement thereof when they are not in engagement with said pipe, the weight of which substantially exceeds this force, wherein the first member is L-shaped with a substantially horizontal arm engaging said pipe and a substantially vertical arm parallel to a third member on said appliance, said third member being connected to said raisable and lowerable apparatus and movably connected to said vertical arm via a link and a portion of said second member parallel to said link.

Re. 32,533

HYDROCARBON FUELS WITH CARBURETOR DETERGENT PROPERTIES

William J. Trepka, and Richard J. Sonnenfeld, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Original No. 12,091,980, Ser. No. 8,311,979. Application for reissue Jul. 6, 1982, Ser. No. 395,553

Int. Cl.[4] C10L *1/22*

U.S. Cl. 44—62 **69 Claims**

47. Nitrogen-containing organic compound-grafted, hydrogenated, conjugated diene/monovinylarene copolymers having a polymerized monovinylarene content of about 20 to 70 weight percent with the proviso that when said copolymer contains a random block the block polymonovinylarene content is less than about 35 weight percent, a number average molecular weight in the range of about 1,000 to 10,000, at least about 95 weight percent of olefinic of said copolymer double bonds hydrogenated and less than about 5 weight percent of aromatic double bonds hydrogenated, prepared by the process which comprises reacting a metalated, conjugated diene hydrocarbon/monovinylarene hydrocarbon copolymer, optionally hydrogenated, with effective amounts of at least one nitrogen-containing organic compound represented by the general formulae $X—Q—(NR^3_2)_n$ *or* $Y[Q—(NR^3_2)_n]_m$ *wherein each* R^3 *is the same or different alkyl, cycloakyl, aryl, or combination radical, Q is a hydrocarbon radical having a valence of* $n+1$ *and is a saturated aliphatic, saturated cycloaliphatic, aromatic or combination radical, X is a functional group capable of reaction on a one-to-one basis with one equivalent of polymer metal, Y is or contains a functional group capable of reacting on a one-to-one basis with one equivalent of polymer metal, n is at least one, and m is 2 or 3, and wherein when said metalated copolymer has not been hydrogenated, subsequently hydrogenating said grafted copolymer.*

Re. 32,534

PEPTIDES, PROCESS FOR PREPARING THE SAME AND PSYCHODEPRESSANT COMPOSITIONS CONTAINING THE SAME

Noboru Yanaihara, Shizuoka; Nobuo Sugiura, Hashima, and Takashi Hiyama, Tokushima, all of Japan, assignors to Amano Pharmaceutical Co., Ltd., Nagoya, Japan

Original No. 4,517,180, dated May 14, 1985, Ser. No. 545,994, Oct. 27, 1983. Application for reissue Jan. 3, 1986, Ser. No. 816,071

Claims priority, application Japan, Oct. 27, 1982, 57-189740; Jul. 20, 1983, 58-133065

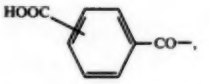
Int. Cl.[4] A61K *37/02;* **C07C** *103/52*

U.S. Cl. 514—15 **12 Claims**

1. A peptide represented by the formula

R—Tyr(SO_3H)—Met—Gly—Trp—Met—Asp—W—NH_2

wherein R is HOOC—A—CO—Asp— (wherein A is lower alkylene), pGlu—Asp—, HOOC—A—CO— (wherein A is lower alkylene) or



and W is Phe or N^{α}-lower alkyl-Phe, or a salt thereof *with the proviso that when R is* $HOOC(CH_2)_2CO—$, *W is* N^{α}*-lower alkyl-Phe.*

Re. 32,535

PROCESS FOR THE PREPARATION OF α-6-DEOXYTETRACYCLINES

Ivan Villax, Lisbon, and Philip R. Page, Parede, both of Portugal, assignors to Plurichemie Anstalt, Liechtenstein

Original No. 4,500,458, dated Feb. 19, 1985, Ser. No. 458,067, Jan. 14, 1983. Application for reissue May 1, 1986, Ser. No. 858,660

Int. Cl.[4] C07C *103/19;* **B01J** *31/04*

U.S. Cl. 260—351.5 **20 Claims**

1. A new improved homogeneous hydrogenation process to prepare α-6-deoxytetracyclines in high yield and purity from a 6-deoxy-6-demethyl-6-methylenetetracycline or salt thereof in the presence or absence of a tertiary phosphine or from a 11a-chloro-6-deoxy-6-demethyl-6-methylenetetracycline or a salt thereof in the presence of a tertiary phosphine by catalytic hydrogenation, characterised in that the catalyst is a tertiary phosphine-hydrazino-chlororhodium obtained by reacting a rhodium salt or a complex with a hydrazine or salt thereof.

PLANT PATENTS

GRANTED OCTOBER 27, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,043
APPLE TREE NAMED PAR-FECT SPUR CRITERION

Allen D. Fechtig, 1642 Christmas Tree Dr., Albany, Oreg. 97321

Filed Oct. 2, 1985, Ser. No. 783,152
Int. Cl.[4] A01H *5/03*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree, substantially as shown and described, characterized particularly by its smaller size and advanced fruit maturity when compared to non-spur Criterion.

6,044
PLUM TREE, MIDNIGHT SUN

Thomas O. Chamberlin, Sr., Visalia, Calif., assignor to H. P. Metzler & Sons, Del Rey, Calif.

Filed Nov. 27, 1985, Ser. No. 802,357
Int. Cl.[4] A01H *5/03*
U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree substantially as illustrated and described, which is characterized as to novelty by producing fruit which is mature for harvesting approximately Aug. 20 at Del Rey, Calif., and which further bears a large, black plum which is nearly round in shape, having a nearly white flesh which has a mild, noteworthy flavor and which further displays exceptional handling and cold storage characteristics.

6,045
PEACH TREE (SIERRA LADY)

Michael D. Jost, 1262 S. Rupert St., Reedley, Calif. 93654

Filed Dec. 6, 1985, Ser. No. 806,267
Int. Cl.[4] A01H *5/03*
U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree, substantially as illustrated and described, which is phenotypically very similar to the O'Henry, but distinctively characterized, in comparative fruit maturity, by ripening substantially two weeks earlier.

6,046
CACTACEAE PLANT

Barnell L. Cobia, Winter Garden, Fla., assignor to B. L. Cobia, Inc., Winter Garden, Fla.

Filed May 30, 1985, Ser. No. 740,116
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—88 **1 Claim**

1. The new and distinct plant variety of the Cactacea family and described and illustrated and which is principally distinguished by a growth habit that combines the following characteristics:

(1) A faster growth rate providing larger specimens at comparable stages of maturity than either of the 'Christmas Cheer' or 'Peach Parfait' varieties,

(2) A more upright posture and compact appearance than the 'Christmas Cheer' variety as evidenced by more erect stems and heavier (more frequent) branching with or without inducement by pruning,

(3) A greater resistance to stem breakage from handling than either of the 'Christmas Cheer' or 'Peach Parfait' varieties,

(4) Phylloclades that are longer and wider in comparison to the 'Christmas Cheer' variety,

(5) A greater resistance to nutrient deficiences and to known problem diseases of the related varieties than the 'Christmas Cheer' variety,

(6) A greater tendency for multiple bud formations at the tips of the branches and a greater resistance to bud abscission than the 'Christmas Cheer' variety,

(7) A habit of producing more blooms than the 'Christmas Cheer' variety and which are larger and have longer tepals than those of the 'Christmas Cheer' variety,

(8) A bloom life that is generally longer than the bloom life of the 'Christmas Cheer' and 'Peach Parfait' varieties,

(9) A bloom that in color is distinguishable from those of the 'Christmas Cheer' and 'Peach Parfait' varieties by

(a) a generally lighter appearing color than either of the 'Christmas Cheer' or 'Peach Parfait' varieties, and

(b) a color that is dominated by yellowish pink and/or orange hues and more uniformly distributed throughout the marginal and center field areas of the tepal blades of the tube laminating and tube forming series of tepals in comparison to either of the 'Christmas Cheer' or 'Peach Parfait' varieties, and

(10) Sterile specimens.

PATENTS

GRANTED OCT. 27, 1987

ERRATA

For CLASS	See PATENT NO.
437-129	4,701,995
437-044	4,701,996
437-005	4,701,997
437-031	4,701,998
437-211	4,701,999
437-063	4,702,000
098-037	4,702,149
072-338	4,702,152
105-035	4,702,291
206-624	4,702,407
208-390	4,702,487
380-059	4,702,497
439-152	4,702,537
439-292	4,702,538
439-588	4,702,539
439-371	4,702,540
439-304	4,702,541
439-347	4,702,542
439-271	4,702,543
439-395	4,702,544
439-856	4,702,545
437-129	4,702,781
437-233	4,702,937
503-204	4,703,335
365-016	4,703,407
369-044	4,703,408

PATENTS

GRANTED OCTOBER 27, 1987

GENERAL AND MECHANICAL

4,701,962
PROTECTIVE EYEWEAR
James A. Simon, Huntertown, Ind., assignor to Eye Pro, Inc., Fort Wayne, Ind.
Filed Dec. 24, 1985, Ser. No. 813,070
Int. Cl.[4] A61F *9/00*
U.S. Cl. 2—15 **7 Claims**

1. A method for reducing the exposure of an eye to eye irritants and to incident radiation selected from ultraviolet, visible and infrared light, which method comprises

forming an ovoid to circular shaped film segment, said segment comprising a polymeric film having a radiation transmittance value of less than 1 for at least a portion of said incident radiation,

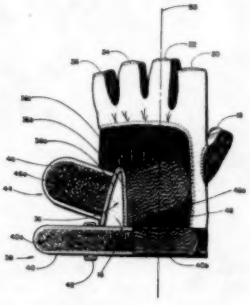
applying a contact adhesive to a locus on one side of the shaped film segment, said locus being coincident with at least a portion of a peripheral edge of the shaped film segment,

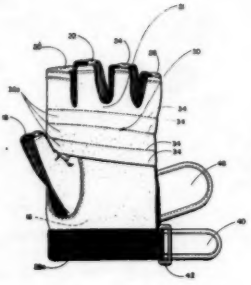
forming said segment into a substantially cone-shaped eye protector so that the peripheral edge of the segment essentially forms the base of the cone-shaped eye protector, and

positioning said eye protector to cover the eye so that the base of the cone-shaped eye protector is in adhesive contact with the fleshy structures immediately adjacent the eye in the eye cavity, in which method the adhesive applied on one side of the shaped film segment functions both as a shape retaining means for the eye protector and as a position retaining means when the eye protector is positioned to cover the eye.

4,701,963
GLOVE
V. Parker Overton, 111 Red Banks Rd., Greenville, N.C. 27834
Filed Feb. 24, 1987, Ser. No. 17,744
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—161 A **13 Claims**

1. A sports glove comprising: a palm and back side secured together to form a hand receiving opening having a series of thumb and finger openings including an index, middle and little finger openings and wherein the palm and back side include a wrist cuff area opposite the thumb and finger openings that extends around a subject's wrist when the glove is worn; a padded palm overlay secured to the palm side adjacent the thumb and finger openings and including a series of side by side transversely extending ridges that extend in general parallel relationship to each other and which are angled across the palm area of a subject's hand so as to generally extend at least slightly upwardly from the fourth finger opening toward the index finger opening; a dual strap assembly associated with said glove for securing the glove onto a subject's hand; said dual strap attaching assembly including an elongated slit formed in the wrist cuff area and extending through the back side of the glove toward the finger openings and having a terminating point situated intermediately between the finger openings and the wrist cuff; said dual strap attaching assembly including a wrist strap secured to one side of the slit and cooperating wrist strap securing means for securing the wrist strap to the glove; said dual strap attaching assembly further including an angled attaching strap secured about the back panel of the glove independently of the wrist strap and disposed between the wrist strap assembly and the finger openings for further securing the glove about the subject's hand; and wherein said angled attaching strap is secured on one side of





the slit and wherein there is provided an angled strap securing means disposed on the opposite side of the slit for securing the angled attaching strap to the back side such that when secured the angled strap extends across the back of the subject's hand at an angle to a longitudinal centerline of the middle finger opening.

4,701,964
GARMENT HAVING ADDITIONAL SUPPORT TO SELECTED PORTIONS
William D. Bell, Tuxedo Park, N.Y.; Jane P. Gannaway, Mahwah, N.J.; Dolores O'Boyle, Woodridge, N.J.; Anthony Tedeschi, Highland Lakes, N.J., and Toshiko Taniyama, White Plains, N.Y., assignors to International Playtex, Inc., Stamford, Conn.
Filed Jul. 29, 1986, Ser. No. 891,719
Int. Cl.[4] A41B *9/04*
U.S. Cl. 2—406 **11 Claims**

1. A garment including:

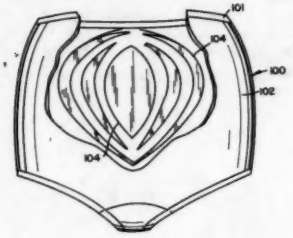
a body portion;

a hot melt powdered adhesive applied in a predetermined pattern onto a selected portion of said body portion; and

a cover panel generally complimentary to said selected portion of said body portion;

said powdered adhesive being fused to said cover panel and

said body portion so as to interconnect said cover panel and said body portion thereby creating a control area adapted to selectively reduce the stretchability of said body portion,



wherein said powdered adhesive simultaneously provides an aesthetically pleasing pattern visible through said body portion.

4,701,965

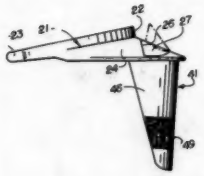
VISOR-TYPE MASK FOR DENTISTS

Timothy J. Landis, 1046 Mangrove Ave., Chico, Calif. 25926

Continuation-in-part of Ser. No. 786,750, Oct. 11, 1985. This application Mar. 21, 1986, Ser. No. 842,150

Int. Cl.[4] A61F *9/02;* **A41D** *13/00*

U.S. Cl. 2—428 **30 Claims**



1. A face mask comprising a visor, first means for supporting said visor projecting forward from the head of the wearer above eye level, a shield supported by said visor, said shield being transparent over at least a substantial portion of its area, and second means attaching said shield to said visor to extend down from said visor to below the mouth and around the face to protect the eyes, nose and mouth, said first means comprising a resilient band having a center around the front of the head and discrete, thin, flexible ends engaging the sides of the head, said ends terminating spaced from the back of the head.

4,701,966

TOILET STOOL INSTANT ODOR REMOVAL MEANS

Cyril L. Schafer, Rte. #2, Morrison, Ill. 61270

Filed Apr. 7, 1987, Ser. No. 35,182

Int. Cl.[4] E03D *9/04*

U.S. Cl. 4—213 **8 Claims**

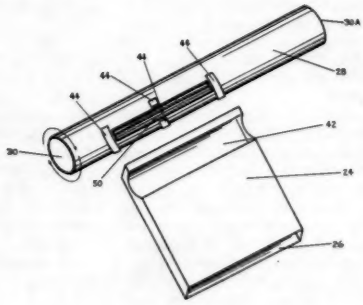
1. An instant air free flow toilet stool odor removal means which is adaptable for use on any modern toilet stool placed within the confines of a room having an external wall for venting purposes, said external wall having a possibility of being located on any one of three sides of said toilet stool, namely, right hand side, left hand side, and the rear of said toilet stool, said modern toilet stool comprising a bowl with a bowl rim molded on the top of said modern toilet stool on a horizontal plane, a toilet seat and a toilet seat cover fastened to-gether by dual purpose hinges which include two threaded bolts inserted through two holes molded at a standard distance apart and at a standard distance from the rear most portion of the toilet bowl rim;

a flush tank fastened directly on the rear most portion of said modern toilet stool and on the same horizontal plane as the previously described toilet seat, wherein said flush tank is an integral part of a modern toilet stool;

said instant air free flow toilet stool odor removal means comprising;

a plastic disposable duct having a wide very low profile odor-air receptive end, the width of said disposable duct allowing said disposable duct to be placed between said hinge bolts of the toilet seat and said disposable duct having a low enough profile to allow the odor-air receptive end to slip under the rear most portion of the toilet seat wherein the odor-air receptive end of said disposable duct is held between the toilet bowl rim and the underface of the rear most portion of the toilet seat; opposite the odor-air receptive end of said disposable duct between said bolts and tank and across the top rear width dimension of said disposable duct is a concave cavity communicating with said duct;

an odor-air receiving manifold of plastic material molded in a circular tubular shape containing a rectangular odor-air receiving opening running lengthwise and midway between the ends of said manifold, and disposed around said



rectangular opening are lugs molded in the proper position as fastening devices utilizing a snap-on action to accept and hold said disposable duct when said manifold is seated in said concave cavity with said opening communicating with said duct, said manifold positioned on the top horizontal plane of the toilet bowl and at the rear of said toilet bowl and running generally parallel to the forward wall of the toilet stool flush tank, within the narrow area between the forward wall of the toilet stool flush tank and the toilet seat hinges, said odor-air receiving manifold extending in both directions beyond each side of the top horizontal plane of the toilet stool, wherein at this position said manifold is in clipped on communication with said disposable duct;

conduit means adapted to be coupled from a choice of the ends of said manifold into the intake opening of the a fan wherein upon activation of said said fan, a free flow of odor-air is created flowing through the toilet bowl and into said duct-manifold and conveyed through said conduit means and through said fan to the exterior, thereby accomplishing the removal of odors from the toilet bowl at the saem instant odors are expelled into said toilet bowl by the person using the toilet stool.

4,701,967

HYDRAULIC UNIT FOR WATERBED, AND METHOD OF FORMING

Mark J. Strobel, 3131 Industrial Pkwy., Jeffersonville, Ind. 47130

Filed Jun. 2, 1986, Ser. No. 869,312
Int. Cl.[4] A47C 27/08; B32B 27/36, 31/20
U.S. Cl. 5—450 5 Claims

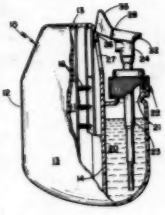
1. A hydraulic unit for a waterbed, said hydraulic unit including a lower sheet having a plurality of chambers formed therein, an upper sheet coextensive with said lower sheet and closing said plurality of chambers, a fibrous bat above said upper sheet and generally coextensive therewith, said lower sheet and said upper sheet being formed of thermoplastic material, said thermoplastic material of said lower and said upper sheets being thermally welded together and having portions of said fibrous bat embedded therein for holding the entire assembly together, said fibrous bat being formed of a material having a higher melting temperature than said thermoplastic material of said lower and upper sheets, said upper sheet being thin relative to said lower sheet, and further including a porous sheet for preventing degradation of said upper sheet, said porous sheet being interposed between said upper sheet and said fibrous bat.

4,701,968

PORTABLE GOLF BALL WASHER

Gary L. Stoltzman, 6315 Upper 44th St., Oakdale, Minn. 55109

Filed Sep. 8, 1986, Ser. No. 904,696
Int. Cl.[4] A63B 47/04; A46B 11/02
U.S. Cl. 15—21 A 4 Claims



1. In a portable hand-held golf ball washer having a partially walled-in ball cleaning chamber and an enclosed chamber for containing cleaning fluid, the improvement comprising:

a vertically movable hand-operable plunger for pumping fluid out of the cleaning fluid chamber, said plunger extending upward from the cleaning fluid chamber outside the wall of the ball cleaning chamber and having a spray orifice at its upper end;

an opening through the wall of the ball cleaning chamber; and

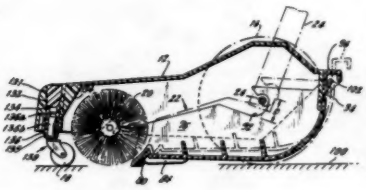
means for directing said spray orifice toward said opening to spray cleaning fluid into said ball cleaning chamber.

4,701,969

ROTARY BRUSH SWEEPER WITH EASILY SEPARABLE DEBRIS PAN

Robert C. Berfield, Jersey Shore; Craig A. Seasholtz, Avis, and Richard M. Fegan, Cogan Station, all of Pa., assignors to Shop-Vac Corporation, Williamsport, Pa.

Continuation of Ser. No. 826,545, Feb. 2, 1986, abandoned. This application Oct. 15, 1986, Ser. No. 918,661
Int. Cl.[4] E01H 1/05
U.S. Cl. 15—79 R 40 Claims



1. A rotary brush sweeper for removing debris from a surface, comprising:

a housing having front and rear portions with respect to movement of the sweeper;

a brush rotatably supported by the housing;

drive means for rotating the brush;

a debris pan situated rearwardly of the brush for collection of debris swept thereinto by the brush;

pan support means for supporting the debris pan relative to the housing but for releasing the debris pan upon rearward pressure on the debris pan;

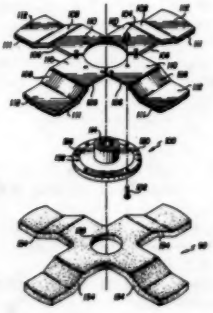
the pan support means comprising an aperture in a lateral suppport portion of the debris pan and a tab projecting from the housing in a generally rearward direction and adapted to protrude through the aperture to support the pan in a releasable manner upon rearward pressure on the pan.

4,701,970

HIGH SPEED FLOOR BUFFING MACHINE AND FLOOR BUFFING PAD

William H. Wilson, Sparta, N.C., assignor to Pioneer/Eclipse Corp., Sparta, N.C.

Continuation-in-part of Ser. No. 632,235, Jul. 19, 1984, Pat. No. 4,598,440. This application Apr. 3, 1986, Ser. No. 847,526
Int. Cl.[4] A47L 11/164
U.S. Cl. 15—98 6 Claims



1. A buffing machine for buffing waxed floors and the like, comprising:

a chassis;

means mounted to the chassis for moving the chassis on a floor;

a motor mounted on said chassis;

a buffing pad holder drivably engaged to said motor and rotated by said motor at a predetermined rotational speed;

a buffing pad having a plurality of radial buffing elements in an X-shape attached to said buffing pad holder, said buffing pad holder having a substantially concave surface for engaging the buffing pad such that only outermost peripheral portions of the buffing elements engage the floor in buffing relation.

4,701,971

WINDSHIELD WIPER SYSTEM

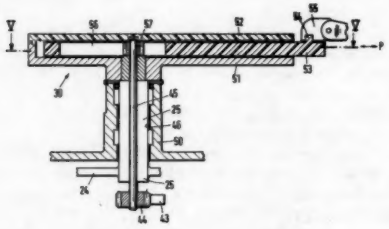
Hans Prohaska, Bietigheim-Bissingen, Fed. Rep. of Germany, assignor to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Jul. 9, 1985, Ser. No. 753,170

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1984, 3426407

Int. Cl.[4] B60S *1/26*

U.S. Cl. 15—250.21 **10 Claims**



1. A wiper system comprising:

a drive motor;

a windshield wiper;

a slide coupled to said windshield wiper;

a guide member for said slide;

a bearing bushing;

a drive shaft mounted in said bearing bushing;

transmission means coupling said drive motor to said guide member whereby said guide member is driven by said drive shaft in pendulum fashion about the longitudinal axis of said drive shaft;

a coupled gear arranged outside said guide member, said coupled gear being disposed on one end of said bearing bushing and said guide member being disposed on the other end of said bearing bushing;

said drive shaft having a longitudinal bore;

a second shaft extending through said bore and operatively connected to said slide;

said coupled gear being operative to rotate second shaft to thereby cause said slide to move radially inward and outward.

4,701,972

ROTARY WINDOW CLEANER

Shosaku Saito, Shizuoka, Japan, assignor to Saito Motors CC., Ltd., Shizuoka, Japan

Filed Jul. 17, 1985, Ser. No. 756,019

Int. Cl.[4] B60S *1/44*

U.S. Cl. 15—250.22 **6 Claims**

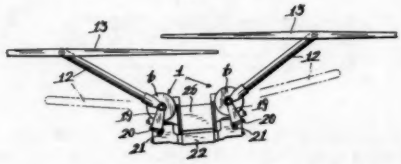
1. A rotary windshield cleaner comprising:

a drive motor, a gear case having a fixed portion and a rotary portion;

a supporting cylinder secured at one end to the rotary portion of said gear case and having wiper means rotatably mounted at the other end;

gear means disposed within said gear case and connected to the output shaft of said drive motor to reduce the power from said motor;

a power transmission train extending through said supporting cylinder and engaged at one end with the gear means accommodated in said gear case and connected at the other end to the wiper means for rotating the wiper means;



an elevating mechanism for swinging the rotary position of said gear case with respect to the fixed portion such that said power transmission train remains engaged with the gears accommodated in the gear case while said supporting cylinder is moved between a raised and lowered position.

4,701,973

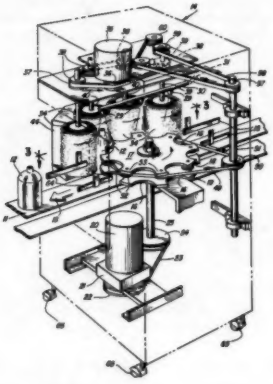
BOTTLE DUSTER

William J. McBrady, 2902 Bob-O-Link Rd., Flossmoor, Ill. 60422, and Julian P. Avelis, Crete, Ill., assignors to William J. McBrady, Flossmoor, Ill.

Continuation-in-part of Ser. No. 644,240, Aug. 27, 1984, abandoned. This application Oct. 29, 1985, Ser. No. 792,518

Int. Cl.[4] B08B *1/02*

U.S. Cl. 15—306 B **50 Claims**



1. A mechanism for removing fine particulate matter from the exterior of a bottle comprising:

A. a frame;

B. neutralizing means, mounted on said frame, for spraying ionized air on said bottle;

C. brushing means, mounted on said frame, for brushing said exterior of said bottle; and

D. vacuum means, mounted on said frame, for removing air from the immediate vicinity of said bottle.

4,701,974
CABLE COIL HOLDING ASSEMBLY IN A VACUUM CLEANER

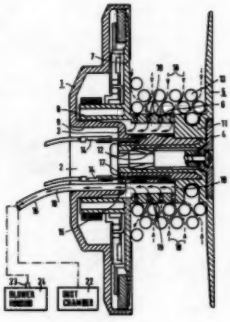
Gerhard König, Bad-Neustadt; Karl Fleck, Ostheim; Herbert Kess, Bad-Neustadt, and Artur Weigand, Niederlauer, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Oct. 29, 1986, Ser. No. 924,700

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 8532395[U]

Int. Cl.[4] A47L *9/26*

U.S. Cl. 15—323 **13 Claims**



1. In a vacuum cleaner, a cable holding assembly for supporting an electrical cable in a wound configuration, said assembly comprising:

a supporting wall in the vacuum cleaner, said supporting wall being formed with a cup-shaped indentation;

a bearing pin rigid with said indentation and projecting substantially perpendicularly therefrom;

a cable drum having a pair of sidewalls attached to a hollow hub and an annular flange extending axially from one of said sidewalls, said hub defining a cavity, said pin extending axially into said cavity, said flange engaging an outer surface of said indentation to form a support bearing therewith for said drum, said hub being provided with radial openings, said indentation being provided with an aperture communicating with said openings via said cavity; and

conduit means in the vacuum cleaner for connecting said aperture to a suction space of the vacuum cleaner.

4,701,975
VACUUM CLEANER ASSEMBLY

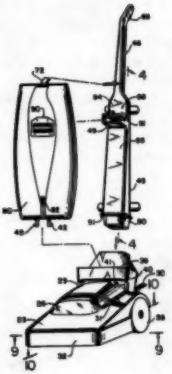
Leonard Hampton, Normal, and Samuel E. Hohulin, Lexington, both of Ill., assignors to National Union Electric Corp., Bloomington, Ill.

Division of Ser. No. 659,166, Oct. 9, 1984, Pat. No. 4,621,930. This application Mar. 10, 1986, Ser. No. 837,676

Int. Cl.[4] A47L *5/30*

U.S. Cl. 15—383 **7 Claims**

1. In an electric vacuum cleaner comprising a floor engaging unit, wherein the floor engaging unit comprises an open bottom casing defining a suction chamber, a motor fixedly mounted on said casing, a brush roll mounted in said casing within said chamber for rotation about a horizontal axis, a belt drive arrangement within said chamber for rotating said brush roll by said motor, and a bottom cover releasably held to said casing to cover the bottom of the chamber, said bottom cover having an aperture substantially solely in vertical alignment with said brush roll, and at least one first floor engaging wheel mounted to said casing at the rear of said floor engaging unit; the improvement wherein there is at least one aperture extending through said bottom cover laterally of said chamber, a second floor engaging wheel rotatably mounted to the upper



side of said bottom cover, forwardly of said first floor engaging wheel and extending downwardly through said aperture.

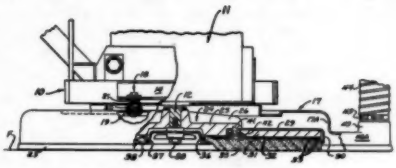
4,701,976
HIGH SPEED FLOOR BURNISHER

Gary E. Palmer, Roselle, Ill., and Mike J. Todd, Eagan, Minn., assignors to Hako Minuteman, Inc., Addison, Ill.

Division of Ser. No. 787,269, Oct. 15, 1985, Pat. No. 4,631,775. This application Jul. 18, 1986, Ser. No. 886,799

Int. Cl.[4] B24B *29/00*

U.S. Cl. 15—385 **8 Claims**



1. In a floor burnisher including a frame, a motor carried by the frame and having a shaft rotating at high speed, a burnishing pad, and a pad driver assembly coupling the motor shaft to the pad for effecting high speed rotation thereof, the improvement comprising: shroud means encompassing the pad an the pad driver assembly for forming a chamber therearound, cushion mount means mounting said shroud means to said frame for resiliently urging said shroud means downwardly thereby to permit said shroud means to conform to variations in floor contour independently of said pad; air flow means for establishing air flow in said chamber to entrain particles generated by the burnishing action, and collection means for receiving said air and said entrained particles.

4,701,977
HINGE STRUCTURE FOR VEHICLE

Yasuaki Hori, Yokohama, and Masayoshi Kishima, Atsugi, both of Japan, assignors to Nissan Motor Company, Limited and Ohi Seisakusho Company, Limited, both of Yokohama, Japan

Filed Apr. 14, 1986, Ser. No. 851,218

Claims priority, application Japan, Jul. 15, 1985, 60-154340

Int. Cl.[4] E05D *7/10*

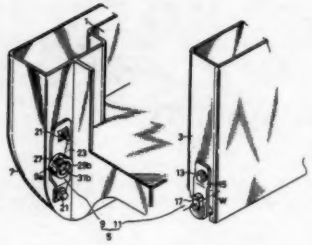
U.S. Cl. 16—266 **12 Claims**

1. A hinge structure for a vehicle comprising:

a projection member having an oblong top surface, a first

pair of arcuate side surfaces and a second pair of side surfaces, and

a support member for rotatably holding said projection member comprising a substantially annular wall portion and a bottom portion, said wall portion having an inner surface to mate with said first pair of arcuate side surfaces, said bottom portion having an inner surface to mate with said top surface, said wall portion having a cutout directed at a predetermined angle above from the horizontal direction and said cut-out having a size larger than the distance between said second pair of side surfaces, but smaller than the distance between said first pair of arcuate side surfaces,



wherein said projection member is integrally formed with a first base plate to be secured to a first vehicle member, and said support member is integrally formed with a second base plate to be secured to a second vehicle member, whereby said first vehicle member is removably connected to said second vehicle member through said hinge structure,

wherein said support member is connected to said second base plate through rivet means with a head portion projecting from said bottom portion, said projection member having a recessed portion at said top surface to receive said head portion.

4,701,978

HINGE PIN GUIDE, ESPECIALLY FOR MUSICAL INSTRUMENTS

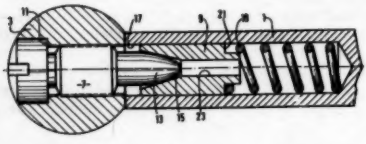
Jean Selmer, Paris, France, assignor to Jacques Selmer, Paris, France

Filed May 27, 1986, Ser. No. 867,472

Claims priority, application France, Jun. 3, 1985, 85 08335

Int. Cl.[4] E05D *5/12*

U.S. Cl. 16—380 **7 Claims**



1. In a mechanism comprising a hinge pin in the form of a cylindrical rod which is axially rotatable by a hand lever, said rod being rotatably supported at least at one end thereof in a hinge support member, an improved hinge pin guide consisting of:

a spring contained in an axial cylindrical bore extending within said rod from said supported end thereof;

a cylindrical pivot piece slidably contained in said bore, one end of said pivot piece being in compression contact with said spring and the other end thereof having an axially tapered frustoconical cutout therein; and

a cylindrical screw, one end of which is affixed in said hinge support member and the other end of which is tapered to an ogival point, such taper fitting inside the taper of the cutout in said pivot piece, the tapered end of said screw being in contact with the tapered surface of said cutout;

whereby the compressive force exerted by said spring against said pivot piece maintains the surface of the tapered cutout therein in contact with the tapered end of said screw, preventing lateral play between said pivot piece and said screw, notwithstanding abrasive wear of such surfaces due to sliding contact there-between during repeated rotation of said hinge pin.

4,701,979

FURNITURE HINGE

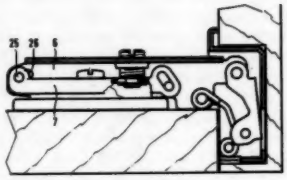
Luciano Salice, Carimate, Italy, assignor to Arturo Salice, S.p.A., Como, Italy

Filed Jul. 17, 1985, Ser. No. 755,798

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1984, 3426353; Nov. 20, 1984, 3442421

Int. Cl.[4] E05D *11/10*

U.S. Cl. 16—346 **20 Claims**



1. A furniture hinge comprising a pot-shaped hinge member which is adapted to be secured to a door or flap and is connected to a hinge bracket by means of two links and pivot pins forming a rectangular or trapezoidal array, a base plate which is adapted to be secured to a carrying wall so that said wall defines a gap with said door or flap, an intermediate plate provided with flanges which is mounted on said base plate and adjustable relative thereto at least in the longitudinal direction of said intermediate plate and which pivotally connects said hinge bracket to said base plate, and an adjusting screw, which is screwed into said hinge bracket and is rotatably mounted in and axially fixed to said intermediate plate and is operable to effect a lateral adjustment of said door or flap by imparting a pivotal movement to said hinge bracket and to retain said hinge bracket in different angular positions, characterized in that the hinge bracket is guided in guide means such as the flanges on said intermediate plate which cooperate with said hinge bracket through means such as angled lugs on said hinge bracket, a pin at least on said hinge bracket and the adjusting screw on said hinge bracket which is rotatably mounted in and axially fixed to said intermediate plate in such a manner so that during a pivotal movement said hinge bracket will be displaced in its longitudinal direction relative to the intermediate plate to such an extent as to compensate for the tendency of said pivotal movement of said hinge bracket to change the width of said gap.

4,701,980

METHOD FOR THE MULTI-STAGE FIBRE CABLES AND THE APPARATUS REQUIRED FOR IT

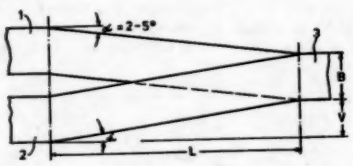
Wolfgang Bäcker, Pulheim; Wolfram Wagner, Dormagen; Günther Hahn, Dormagen, and Ralf Miessen, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 3, 1986, Ser. No. 847,798

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1985, 3514863

Int. Cl.[4] D06B *21/00*; D02G *1/12*

U.S. Cl. 19—0.48 4 Claims



1. In a method for the after-treatment of washed and dried fibre cables having a minimum mass of 250 ktex by crimping, fixing, cooling and optionally cutting or tearing, the improvement wherein the band width of the dried cable with a covering density of at most 5 ktex/cm is reduced by at least 50% of the original band width by dividing the original cable into at least two individual bands and packing the bands one over the other to obtain a corresponding increase in the packing density is crimped in a stuffer box crimping means at a stuffer box pressure of from 1.5 to 6N/cm^2 and a stuffer box temperature of from 80° to 95° C., the crimping is fixed in or immediately after the stuffer box, the cable is deposited on the surface of an air-permeable conveyor belt, air is blown or sucked through the fibre package and conveyor belt and the cable is then optionally supplied to a tear converter or a cutting machine.

4,701,981

APPARATUS FOR PNEUMATICALLY FEEDING A PLURALITY OF CARDING MACHINES

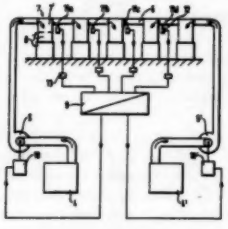
Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Nov. 20, 1985, Ser. No. 799,971

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1983, 3442942

Int. Cl.[4] D01G *15/40*

U.S. Cl. 19—105 11 Claims



1. In an installation for pneumatically supplying fiber material to a plurality of carding machines arranged for simultaneous operation; said installation including a plurality of card feeders, each being operatively connected to a separate said carding machine; each card feeder having a feed chute delivering fiber material to the carding machine associated therewith and a reserve chute delivering fiber material to the feed chute associated therewith; a common transport conduit connected to the reserve chute of each said card feeder and fan means contained in said common transport conduit for advancing fiber material by an air stream through said common transport conduit to said card feeders, the improvement comprising control means for varying a flow rate of the air stream in said common transport conduit as a function of at least one operational parameter selected from the group consisting of parameters pertaining to lot-specific data of the fiber material and the quantity of momentarily operating carding machines.

4,701,982

CLAMP BAND

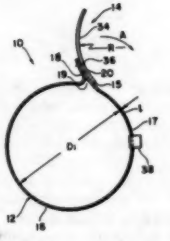
Yutaka Matsuno, Toyota; Tadanobu Kumagai, Okazaki, and Hatsuyuki Tanaka, Chino, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Kabushiki Kaisha Mihama Seisakusho, Chino, both of, Japan

Continuation of Ser. No. 695,218, Jan. 25, 1985, abandoned. This application Sep. 23, 1986, Ser. No. 910,823

Claims priority, application Japan, Jan. 27, 1984, 59-9136

Int. Cl.[4] B65D *63/00*

U.S. Cl. 24—273 2 Claims



1. A clamp band, comprising:

a strip member having an intermediate portion formed to substantially conform to an outline of an article to be fastened and two ends projecting outward from said intermdeiate portion; and

a lever member having a substantially rectangular cross-sectional shape of which a plurality of cross-sectional inwardly compressed corner means minimize deformation of said lever member when said lever member is in use and extend parallel to a longitudinal axis thereof and are located at junctions between side surfaces of said rectangular cross-sectional shape;

wherein said inwardly compressed corner means of the lever member have a hardness greater than remaining portions of the lever member, and wherein said lever member is welded to said two ends of the strip member at said remaining portions.

4,701,983

CLOTHES CLIP FOR A HANGER

John G. Warmath, 175 Steuben St., Brookyln, N.Y. 11205

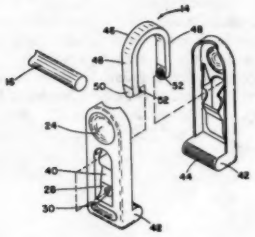
Filed Jul. 9, 1985, Ser. No. 753,160

Int. Cl.[4] A47J *25/14*

U.S. Cl. 24—511 3 Claims

1. A clip assembly arranged for ready assembly on a rod-like element of a predetermined diameter and having a longitudinal axis, said clip assembly comprised of a pair of cooperating jaw members and a resilient bias member, each of said jaw members being a generally planar member and comprised of an elongated first end portion having a fingertip recess, an intermediate portion, and a second end portion including a projection extending at an angle to the plane of said jaw member, said intermediate portion including a wedge portion defining an arcuate recess therein for close receipt of a portion of the periphery of said rod-like element when said clip is assembled thereon, said intermediate portion formed with an elongated

channel and a locking recess disposed about a terminal end portion of said elongated channel proximate said second end portion of said jaw member, said resilient bias member being generally U-shaped and comprised of an arcuate base portion and inwardly extending leg members terminating in a free end having inwardly extending projections, said arcuate base portion of said U-shaped resilient bias member being dimensioned to contact and cooperate with an upper end portion of said elongated channels formed in said intermediate portion of said pair of cooperating jaw members to restrain longitudinal movement between said cooperating jaw members, said elongated channel of said intermediate portion of each of said jaw



members being of a width slightly greater than a width of said leg member to accommodate the leg member disposed therein thereby to provide lateral stability of said clip assembly, said free ends of said bias member being spaced apart by a distance less than a distance between said locking recess of said cooperating jaw members to enable said bias member to be readily secured to said jaw members with said projections of each of said leg members of said bias member overlying and engaging a locking recess of a respective one of said jaw members and said arcuate recesses of said wedge portions of said cooperating jaws forming a substantially circularly-shaped opening to permit positioning of said rod-like member therein.

4,701,984

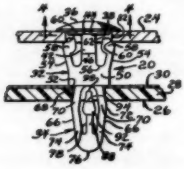
PRINTED CIRCUIT BOARD SUPPORT

Stephen G. Wyckoff, Arlington Heights, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Aug. 2, 1982, Ser. No. 405,444

Int. Cl.[4] F16B *13/04*

U.S. Cl. 24—573 **1 Claim**



1. A printed circuit board support of integral plastic construction comprising a head and downwardly extending body, said body having a mounting portion and retainer portion where said mounting portion is designed to be inserted into a polygonal aperture of a mounting panel and where said retainer portion is designed to be inserted in a mounting aperture of a printed circuit board, said head having a larger cross sectional dimension than said polygonal aperture and having an anti-rotational section formed on its undersurface, said anti-rotational section having a cross sectional shape the same as but slightly smaller than said polygonal aperture and having a thickness less than one third the thickness of said mounting panel, said retainer portion including abutment means for engaging one surface of said printed circuit board which faces said mounting panel and resilient retaining means that yields upon insertion through said mounting aperture of said printed circuit board and that returns to original position thereafter to bear against the opposite surface to said one surface of said printed circuit board, and said mounting portion includes a stem integrally connected in a normal relation to the center of said anti-rotational section and a pair of symmetrically disposed resilient arms extending in a diverging relation away from said stem in a direction toward said head and having outer free ends converging towards said stem, said outer free ends being spaced a small distance from said anti-rotational secton whereby said resilient arms yield resiliently upon insertion through said polygonal aperture and thereafter return toward the initial position to cause said free ends to engage the back said of said panel to mount said support in said panel.

4,701,985

APPARATUS FOR DETECTING ANOMALIES IN CORDUROY PREPARATION

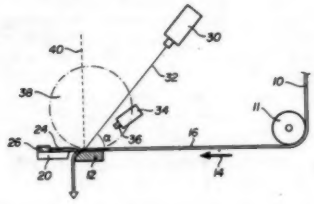
G. Carlo Ribolla, Bergamo; Federico Taroni, Curno; Domenico Peiretti, and Antonio Pepino, both of Turin, all of Italy, assignors to Leglertex s.r.l., Italy

Filed Dec. 19, 1984, Ser. No. 683,592

Claims priority, application European Pat. Off., Dec. 22, 1983, 83810611.0

Int. Cl.[4] D06C *13/08*

U.S. Cl. 26—10 C **7 Claims**



1. Apparatus for detecting web anomalies in a cutting machine for the manufacture of corduroy velvet webs, the cutting macine including means for advancing a corduroy base web having lengthwise rows of weft yarn loops over a horizontal supporting bar to a plurality of needle-like cutters for introduction of a cutter into each yarn loop to effect severing of the weft rows,

the detecting means comprising

(a) a laser beam scanning unit arranged for projecting at least one laser beam sweeping substantially at a right angle to the advancing direction of said web, over the total width of the web and at the location where said anomalies are to be detected,

(b) an anomaly detecting device for

(1) detecting an intensity of light from the laser beam reflected by the web caused by light reflectance from emergence of a needle-like cutter from a respective weft row or abnormal light absorption by web defects,

(2) detecting changes in said intensity indicative of such anomalies in the web,

(3) generataing an anomaly signal in response to such detected changes, for indicating detection of an anomaly in the web; and

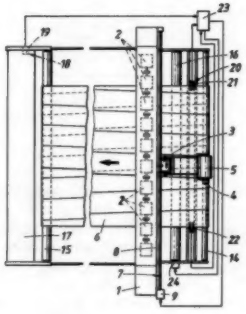
(c) at least one trigger unit for generating a signal for stopping the corduroy cutting machine and the advance of the web in response to an anomaly signal from said anomaly detecting device.

4,701,986

APPARATUS FOR MAKING NEEDLE FELTS FOR PAPER MACHINES

Feyerl Günther, Linz; Augustin Kalteis, Traun, and Hannes Pum, Wels, all of Austria, assignors to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria

Filed Jun. 19, 1986, Ser. No. 877,029
Claims priority, application Austria, Jun. 21, 1985, 1848/85
Int. Cl.[4] D04H 18/00
U.S. Cl. 28—142 6 Claims



1. In apparatus for making a needle felt for paper machines, comprising

a needle machine having a working width and comprising a plurality of deflecting rollers adapted to support an endless backing web trained around said deflecting rollers so as to define in said backing web an upwardly facing web portion, said deflecting rollers being operable to impart to said backing web an advancing movement in the longitudinal direction of said web,

a sliver feeder, which is adapted to perform a traversing movement across said working width, said sliver feeder being operable to deliver and apply a sliver to said upwardly facing web portion,

a needling mechanism of a smaller working width than that of the needle machine between said sliver feeder and said needle machine, and

a traversing drive for imparting to said sliver feeder and needling mechanism a traversing movement across said working width so that said sliver will be applied to said upwardly facing web portion to extend thereon at a bias angle to said longitudinal direction, which bias angle depends on the ratio of the velocites of said advancing and traversing movements,

the improvement residing in that

said needle machine comprises a position-correcting mechanism for maintaining one longitudinal edge of said backing web in a predetermined position at at least one point of said upwardly facing web portion,

dimension-detecting means are provided for generating output signals representing changes of at least one of the dimensions consisting of the length of said backing web and of its width in said upwardly facing web portion, and

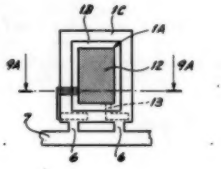
speed control means are provided for controlling the speed of said traversing drive in dependence of said output signals.

4,701,987

PROCESS FOR MANUFACTURING HIGH FREQUENCY QUARTZ RESONATORS

Bruno Studer, Rüttenen, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Granges, Switzerland

Filed Feb. 4, 1986, Ser. No. 826,048
Claims priority, application France, Feb. 13, 1985, 85 02156
Int. Cl.[4] H01L 41/08, 41/10
U.S. Cl. 29—25.35 12 Claims



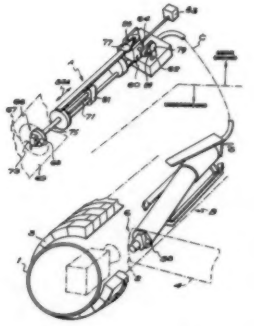
1. A process for manufacturing a quartz resonator, said resonator comprising an active central element surrounded by a reinforcing frame from which it is separated by at least one connecting member of a smaller thickness, said process consisting in subjecting a quartz substrate with parallel faces to selective operations of chemical etching and photolithography, and said operations comprising reducing the thickness of the substrate in the marginal area corresponding to said connecting member of said resonator whilst preserving those areas corresponding to said central element to said reinforcing frame, and further reducing the thickness of said marginal area at the same time as reducing the thickness of said central portion, said further reduction in thickness again not affecting the thickness of said reinforcing frame.

4,701,988

RELATING TO CUTTERS

Eric Wood, Wellingborough, England, assignor to Insituform International N.V., Netherlands Antilles

Filed Mar. 22, 1985, Ser. No. 714,794
Claims priority, application United Kingdom, Mar. 24, 1984, 8407707
The portion of the term of this patent subsequent to Apr. 17, 2001, has been disclaimed.
Int. Cl.[4] B23P 17/00; E03F 3/06
U.S. Cl. 29—33 T 24 Claims



1. A cutter apparatus for cutting apertures in the side of a conduit from the inside of the conduit, which apparatus includes

(1) a slave unit for location inside the conduit comprising

(a) a mounting member which is adapted to contact a

portion of the interior of the conduit and permit movement of the slave unit within the conduit,

(b) a body supported on said mounting member,

(c) a cutter head carried by said body, said cutter head having at least one cutter,

(d) universal movement means associated with said body which permits said cutter head, within the physical confines of the conduit, to be angled at any desired angular disposition in relation to the aperture to be cut, and

(2) a master unit for location outside the conduit which is operatively connected to said slave unit, said master unit including

(a) a follower having means to follow the outline of template that simulates the contours of an aperture to be cut in the conduit,

(b) means associated with said follower so that manipulation of said follower along the contours of a template by either hand or by automatic control will result in said cutter head moving in a corresponding path.

4,701,989

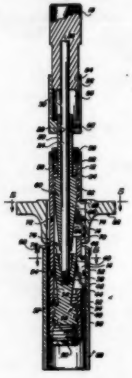
PIPE AND FLANGE ALIGNMENT TOOL

Ian S. Cayzer, 6211 Silver Springs NW, Calgary, Alberta, Canada T3B 3E5

Filed Aug. 1, 1986, Ser. No. 891,620

Int. Cl.[4] B23K *37/04*

U.S. Cl. 29—271 **13 Claims**



1. An alignment tool by which a flange can be held in axially aligned relationship respective to the end of a pipe, comprising:

a main body, a first plurality of circumferentially spaced apart windows formed in one marginal end of said main body, a second plurality of windows formed through the opposed marginal end of said main body;

a first mandrel received within said first marginal end of said main body, means for axially moving said mandrel, said mandrel having a conical surface formed on the exterior thereof, a blade having an inclined surface engaging said conical surface, and an oppossed edge portion extending through said windows;

a second mandrel having a conical surface formed on the exterior thereof, a second blade having an inclined surface engaging said conical surface, and an opposed edge portion extending through said second windows;

means for moving said first and second mandrels toward and away from one another to thereby extend and retract said blades.

4,701,990

BALL-AND-SOCKET JOINT ASSEMBLY TOOL AND METHOD

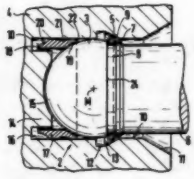
Georg Kehl, Stuttgart, and Ernst-Dieter Schafer, Pliezhausen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 2, 1986, Ser. No. 937,179

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1986, 3607149

Int. Cl.[4] B23P *11/00, 11/02, 19/00;* **B21D** *53/10*

U.S. Cl. 29—441 R **9 Claims**



1. A method of assembling ball and socket members to provide an unrestricted joint therebetween comprising the steps of forming a ball-shaped member on a rod element terminating in an annular wall on one end of the rod element, forming an annular collar on said rod adjacent said ball-shaped member to form a first circumferential groove between said annular wall and said collar, forming an outer structure having a cylindrical blind bore having conically an inner wall, forming a conically flared entrance area having a throat for receiving said ball-shaped member, said entrance area throat being contiguous with said inner wall, forming a coaxially extending stub portion in said blind bore, with a coaxial concave curved face surrounded by an annular space, forming a second circumferential groove with a conical groove bottom in said inner wall axially spaced from said curved face on said stub portion, positioning a radially elastic retaining ring in said second circumferential groove, forming an annular assembly tool with a contour on the outer surface of one end and a conical section on the inner surface of the opposite end with an annular groove between the ends, inserting said assembly tool into said outer structure to center said retaining ring in said second circumferential groove and to force said retaining ring onto said annular groove on said assembly tool, inserting said ball shaped member into said throat of said outer structure to seat on said conical end section of said assembly tool forcing said ball shaped member into said outer structure thereby, forcing said assembly tool through said retaining ring and an end portion thereof

into said annular space with said ball shaped member passing through said retaining ring whereupon said retaining ring enters said first circumferential groove disposed between said collar and said ball element on said rod thereby securing the ball element in said outer structure.

2. A socket and assembly tool for assembling a ball head integrally formed on a rod, in the socket by use of a radially elastic retaining ring which assembly tool comprises an outer structural part having a cylindrical blind bore, which bore forms an inner wall, an axially extending stub portion surrounded by an annular space, said annular stub having a coaxial concave face, a circumferential groove in the inner wall outwardly of a center point for said concave face an annular support face extending outwardly from said circumferential groove which widens substantially conically toward the open end of said blind bore said radially elastic retaining ring supported in said circumferential groove; an auxiliary assembly tool for introduction into said outer structural part for holding said retaining ring in said circumferential groove of the outer structural part, said auxiliary assembly tool including an inner centering end for centering said retaining ring, an outer centering end for centering said ball head and an intermediate portion for receiving said retaining ring which holds said assembly tool within said blind bore.

4,701,991

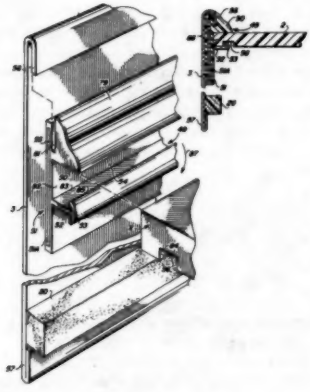
METHOD FOR MAKING CHANNEL LETTERS FOR SIGNS

Louis G. Scheffer, Sr., 1831 W. 19th St., Yuma, Ariz. 85364

Continuation-in-part of Ser. No. 622,067, Jun. 19, 1984, abandoned. This application Oct. 15, 1985, Ser. No. 787,515

Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—450 **5 Claims**



1. A method of making a channel letter, comprising the steps of:

(a) providing a piece of channel siding and attaching edge joint means to an outer edge portion of the inner surface of the channel siding;

(b) providing a letter face having an outer face, inner face, and an edge;

(c) forming a continuous edge groove disposed in the inner surface along the edge of the letter face;

(d) bending said piece of channel siding having an inner surface, an outer surface, front edge and a rear edge (to conform to the shape of the letter face; and

(e) inserting the edge of the letter face into a groove in the edge joint means and causing snap-attaching means to extend into the edge groove to attach the letter face to the channel siding.

4,701,992

Patent Not Issued For This Number

4,701,993

METHOD OF INSTALLING THREADED FASTENER

William D. Bradley, Welwyn Garden City; Zia R. Alvi, Hatfield, and Raymond D. Lacey, Essendon, all of England, assignors to Advel Limited, Hertfordshire, England

Division of Ser. No. 613,731, May 24, 1984, Pat. No. 4,642,010. This application Oct. 28, 1986, Ser. No. 924,013

Claims priority, application United Kingdom, Jun. 1, 1983, 8315077

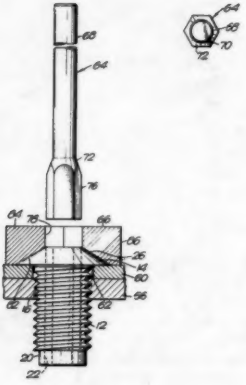
Int. Cl.[4] B21D *39/00;* **B23P** *11/02*

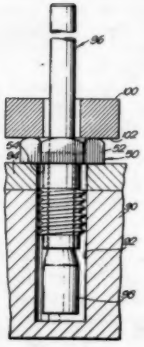
U.S. Cl. 29—523 **6 Claims**

1. A method of fastening one or more apertured members to an apertured workpiece, an aperture of the or each member being aligned with an aperture in the workpiece, which method comprises the steps of inserting into the aligned apertures a fastener, said fastener being formed of ductile material and having a head, a shank, and an axial bore of constant diameter extending through the shank and into the head, the head having a counterbore continuous with said axial bore, said shank being circumferentially entire and having a tail portion remote from the head, and a threaded part between the tail portion and the head, said threaded part being formed with an external screw-thread having a sharp crest, and the external diameter of the tail portion being less than the major diameter of the screw-threaded part, said fastener being inserted so that the head engages a face of the said one member, and the shank extends through the member or members and into the workpiece, and at least a part of the screw-thread is within the workpiece, and then, while supporting the fastener at the head, drawing into and entirely through the bore, in the direction from the tail portion to the head, a tapering, enlarged, mandrel head capable of expanding the bore, and thereby enlarging the bore evenly throughout its length and causing ductile radial expansion of the shank sufficient to cause the external screw-thread to embed in the workpiece, and the tail portion to be expanded to an external diameter less than the major diameter of the expanded threaded part so as not to interfere with the workpiece.

6. A method of fastening one or more apertured members to an apertured workpiece, an aperture of the or each member being aligned with an aperture in the workpiece, which method comprises feeding onto a mandrel a fastener comprising a circumferentially entire tubular shank and a radially enlarged head at one end of the shank, said shank having an externally cylindrical, unthreaded, tail portion at the end remote from the head, a part having a sharp-crested external screw-thread between the tail portion and the head, and a bore of constant diameter extending axially throughout the shank

and into the head, the external diameter of the tail portion being substantially the same as the minor diameter of the screw-threaded part, said head having an enlarged counterbore which meets the bore of the shank, said mandrel having an elongate stem and an enlarged head at one end of the stem, the mandrel head having a conically tapered portion in which the diameter of the mandrel increases away from the stem towards a radially-enlarged key forming portion remote from the stem and of noncircular cross-sectional shape and greater transverse dimension than the bore of the fastener, the fastener being fed on to the mandrel so that the stem extends through the bore





and projects from the head end of the fastener and the mandrel head is adjacent to the tail portion of the fastener, and then entering the mandrel head and shank of the fastener engages the said one member, and at least part of the screw-thread is within the workpiece, and then drawing the mandrel head into and entirely through the bore while supporting the head of the fastener, and thereby radially expanding the shank uniformly throughout its length sufficiently to cause the screw thread to become embedded to substantially the whole of its depth in the workpiece, and imposing on the bore a cross-sectional shape corresponding to the cross-sectional shape of the key-forming portion of the mandrel head.

4,701,994

AUTOMATIC TOOL ASSEMBLY APPARATUS

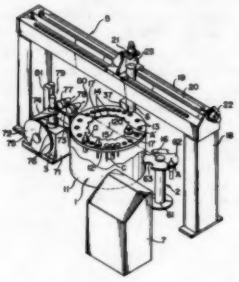
Akihiko Noh, Chigasaki; Shinichi Sato, Kawasaki; Itsusuke Kakuda, Yokohama, and Shigeyuki Kanno, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Toshiba and Toshiba Tungaloy Co., Ltd., both of Kawasaki, Japan

Filed Sep. 19, 1986, Ser. No. 909,339

Claims priority, application Japan, Sep. 20, 1985, 60-206330; Sep. 20, 1985, 60-206331; Nov. 30, 1985, 60-269673

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **12 Claims**



1. An automatic tool assembly apparatus having

a tool stock unit for storing a modular constituted tool, which is constituted by a plurality of modules for a machine tool and is stored in units of separated modules thereof, a tool transfer unit for assembling a predetermined tool from a plurality of modules in said tool stock unit and conveying said predetermined tool therefrom, and a control unit, characterized in that:

said tool stock unit holds said modular constituted tool disassembled into said modules, and a stock position of each required module corresponding to a tool requested by said machine tool is indexed from a signal from said control unit, and said modules are sequentially positioned at an assembly position; and

said tool transfer unit has an assembly head movable in a direction to approach and separate from the assembly position, said assembly head can clamp said module positioned at the assembly position and is moved in a direction to separate from the assembly position in response to a signal from said control unit, sequentially assemble a clamped module to a module positioned at another assembly position to constitute a required modular constituted tool, and transfer said assembled modular constituted tool from said tool stock unit.

4,701,995

METHOD OF MAKING A NONPLANAR BURIED-HETEROSTRUCTURE DISTRIBUTED-FEEDBACK LASER

Gerald J. Dolan, Murray Hill; Ralph A. Logan, Morristown; Henryk Temkin, Berkeley Heights, and Daniel P. Wilt, Scotch Plains, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

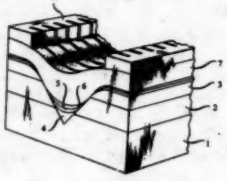
Filed Oct. 29, 1986, Ser. No. 924,518

Int. Cl.[4] H01L *21/66, 21/208, 21/36;* H01S *3/19*

U.S. Cl. 437—129 **5 Claims**

1. Method for making a distributed feedback laser, said method comprising forming a buried heterostructure on a

substrate by sequential deposition of layers including an active layer and a cladding layer, said method comprising a step of



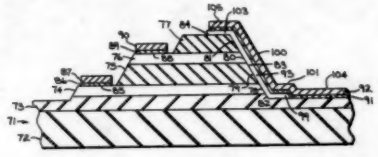
producing a grating structure on a nonplanar surface of said cladding layer.

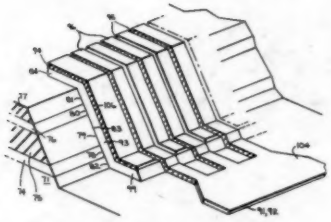
4,701,996

METHOD FOR FABRICATING EDGE CHANNEL FET

Joseph A. Calvielio, 30 Ashland Dr., Kings Park, N.Y. 11754

Division of Ser. No. 683,722, Dec. 19, 1984, Pat. No. 4,620,207.
This application Feb. 20, 1986, Ser. No. 831,932
Int. Cl.[4] H01L *21/283, 29/78, 29/94, 49/02*
U.S. Cl. 437—44 **3 Claims**





1. A processing method for fabricating an edge channel field effect transistor comprising the steps of:

supplying a substrate with an upper surface;

sequentially growing a first semiconductor layer of one conductivity type, a first insulating layer, a second semiconductor layer of said one conductivity type and a second insulator layer;

defining a mesa having sides exposing the edges of said layers;

forming a third semiconductor layer of said one conductivity type over the top and sides of said mesa and the upper surface of said substrate;

defining a channel in said third semiconductor layer, and upper surface contact areas on said first and second semiconductor layers, by etching portions of said first and second insulator layers and said second and third semiconductor layers to leave said third semiconductor layer on a side of said mesa covering the edges of at least said first semiconductor layer and a portion of said first insulator layer, and to expose upper surface portions of said first and second semiconductor layers; and

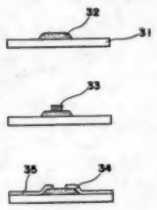
depositing source and drain electrode layers on said exposed portions of said first and second semiconductor layers, and a gate electrode layer on said third semiconductor layer.

4,701,997

METHOD OF MAKING PHOTO-ELECTRIC CONVERTING ELEMENTS

Ryusuke Kita, Tenri; Satoshi Nishigaki, and Shuhei Tsuchimoto, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 8, 1986, Ser. No. 894,943
Claims priority, application Japan, Aug. 8, 1985, 60-176767
Int. Cl.[4] H01L *31/18*
U.S. Cl. 437—5 **13 Claims**



1. A method of making a photo-electric converting element comprising the steps of:

forming a photoconductive layer on an insulative substrate by applying to said insulative substrate a photoconductive substance selected from the group consisting of Group II–VI compound semiconductors which include Cd, and mixtures of two or more Group II–VI compound powders;

baking said photoconductive substance so as to form a photoconductive layer that has

(1) a thickness of 1 to 10 μm,

(2) a surface roughness of 0.2 to 1 μm, and

(3) a peripheral edge tapered outwardly with respect to said insulative substrate at an angle not greater than 60°; and

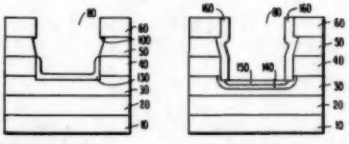
forming a counterelectrode on said photoconductive layer by the use of a lift-off technique so that said counterelectrode overlays a portion of said photoconductive layer.

4,701,998

METHOD FOR FABRICATING A BIPOLAR TRANSISTOR

David C. Ahlgren, Hopewell Junction; Robert E. Bendernagel, Carmel; Russell C. Lange, Wappingers Falls, and Martin Revitz, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 2, 1985, Ser. No. 803,451
Int. Cl.[4] H01L *21/316*
U.S. Cl. 437—31 **6 Claims**



1. The method for the reproducible fabrication of bipolar transistors having a base doping variation of less than 20% comprising:

(a) forming a polysilicon base contact bipolar transistor up to the point just prior to the intrinsic base-emitter formation;

(b) reactive ion etching the intrinsic base-emitter opening through said polysilicon base contact layer down to and into the single crystal silicon body thereunder, whereby the surface of the single crystal body is damaged;

(c) thermally growing a silicon dioxide layer on the exposed

and damaged surface of the single crystal silicon body to convert the damaged silicon surface thereof into silicon dioxide;

(d) removing the silicon dioxide layer by chemical etching to expose undamaged single crystal silicon;

(e) forming a reproducible, uniform, thin screen silicon dioxide layer of a thickness of 50 Å to 500 Å ± 10% on the thus exposed single crystal silicon;

(f) forming the intrinsic base region having the said base doping by ion implantation through the screen silicon dioxide layer;

(g) forming the emitter region within the intrinsic base region; and

(h) making electrical contact to the various elements of the bipolar transistor.

4,701,999

METHOD OF MAKING SEALED HOUSINGS CONTAINING DELICATE STRUCTURES

Clarence K. Palmer, Polo, Ill., assignor to PNC, Inc., Polo, Ill.

Filed Dec. 17, 1985, Ser. No. 810,032

Int. Cl.[4] H01L *23/02*

U.S. Cl. 437—211 **15 Claims**

1. The method of sealing a delicate structure, connected to a flexibly deformable connection sheet, within a housing having a side wall rim extending between top and bottom walls, said delicate structure being subject to damage by passage of or contact with flowing plastic material, said method comprising in combination

(a) forming a bottom wall insert,

(b) forming a top wall cap,

(c) associating said connection sheet with a mold cavity while injecting a plastic material in flowable state, and causing said material to solidify, to form said rim which captures and bonds to said connection sheet,

(d) locating said bottom wall insert in general proximity to the region to be occupied by the lower edges of the rim,

(e) subsequent to said step (d), creating a seal between the edges of said bottom wall insert and said rim,

(f) subsequent to said step (c), installing said delicate structure and making connections between it and the exposed upper surfaces of said sheet,

(g) subsequent to said step (f), locating said top wall cap above the delicate structure and in proximity to the upper edges of said rim, and

(h) subsequent to said step (g), creating a seal between the edges of said cap and said rim, said step (d) being performed prior to step (c) and said steps (c) and (e) being performed concurrently.

4,702,000

TECHNIQUE FOR ELIMINATION OF POLYSILICON STRINGERS IN DIRECT MOAT FIELD OXIDE STRUCTURE

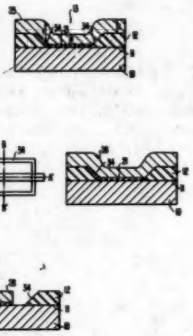
Dyer A. Matlock, Melbourne; Richard L. Lichtel, Jr., and Lawrence G. Pearce, both of Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Mar. 19, 1986, Ser. No. 841,297

Int. Cl.[4] H01L *21/265, 21/22*

U.S. Cl. 437—63 **18 Claims**

11. For use in a direct moat process for manufacturing a semiconductor device wherein a layer of conductive material, that has been non-selectively formed over the surface of a semiconductor structure which comprises a semiconductor body having a planar surface and a field insulator layer disposed therein having an aperture therein exposing a portion of the planar surface of said semiconductor body, is selectively exposed to an etchant for removing selected portions of said layer of conductive material so as to leave a portion thereof extending from the surface of said field insulator layer into said aperture and overlying a portion of the exposed planar surface of said semiconductor body, a method of preventing the formation of residual stringers of said conductive material along the side walls of field insulator layer as a result of the etching of said layer of conductive material comprising the steps of:



(a) tapering the sidewalls of said aperture in said field insulator layer through which said planar surface of said semiconductor body is exposed;

(b) non-selectively forming said layer of conductive material over the structure formed by step (a);

(c) exposing selected surface regions of said layer of conductive material to an etchant, whereby said layer of conductive material is etched to the tapered sidewalls of said field insulator layer and to the planar surface of said semiconductor body; and

(d) removing material from the tapered sidewalls of said field insulator layer so as to effectively increase the slope of the sidewalls of said field insulator layer.

4,702,001

PLIERS FOR RETAINING RINGS

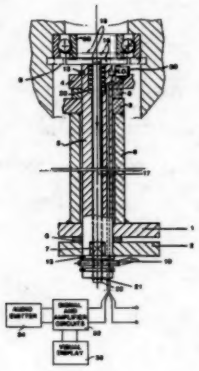
Rune Malm, Konigstein, and Radu Mihalcea, Huckelhaven, both of Fed. Rep. of Germany, assignors to Seeger-Orbis GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Apr. 16, 1986, Ser. No. 852,655

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513585

Int. Cl.[4] B23P *19/08*

U.S. Cl. 29—720 3 Claims



1. Device for installing retaining rings comprising a pair of levers connected to each other by connecting means, each lever having an actuating shank (1,2) on one side of the connecting means and each having a tool shank (3,4) engageable with the retaining ring on the other side of the connecting means, said connecting means comprising a sleeve bearing (5,6) wherein one of the tool shanks (3) is connected by way of the sleeve (6) to one of the actuating shanks (1) and the other tool shank (4) is connected by way of the shaft (5) of the sleeve bearing to the other actuating shank (2) and a gauge device operable to indicate the installation position for the retaining ring (9), consisting of a sensor, which is located near the tool shanks (3,4) and which transmits a signal when the installation position intended for the retaining ring (9) is reached, said gauge device being formed by a feeler which is free to move axially with respect to the tool shanks (3,4), which is elastically supported against them, and which runs against the end surface of the machine element to be retained.

4,702,002

METHOD OF FORMING SIGNAL PROCESSOR MODULE FOR GROUND FAULT CIRCUIT BREAKER

Robert A. Morris, Burlington, and Paul T. Rajotte, Plainville, both of Conn., assignors to General Electric Company, New York, N.Y.

Division of Ser. No. 725,610, Apr. 22, 1985, Pat. No. 4,641,216. This application Oct. 8, 1986, Ser. No. 916,966

Int. Cl.[4] H02H *3/26*

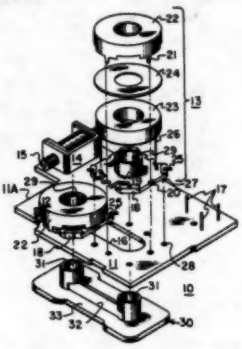
U.S. Cl. 29—837 4 Claims

1. A method for electrically connecting a signal processor ground fault circuit breaker module comprising the steps of:

arranging a pair of apertured current transformers on a slotted printed circuit board;

placing a connecting strap under said printed circuit board slot and inserting one of a pair of hollow tubular extensions on said connecting strap through each of said transformer apertures; and

placing a pair of terminal connector straps over said transformer apertures and inserting a hollow tubular extension on one of said terminal connector straps through one of said current transformer apertures into a press-fit relation with said one connecting strap hollow tubular extensions and inserting a hollow tubular extension on the other of said terminal connector straps through the other of said



current transformer apertures into a press-fit relation with said other of said connecting strap hollow tubular extension to provide a first electrical transport path through said pair of transformers.

4,702,003

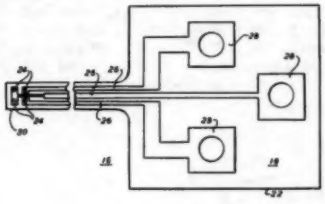
METHOD OF FABRICATING A FREESTANDING SEMICONDUCTOR CONNECTION

William M. Theisen, Madison, and Charles D. Wiseman, Cottage Grove, both of Wis., assignors to The BOC Group, Inc., Montvale, N.J.

Filed Jun. 10, 1985, Ser. No. 743,112

Int. Cl.[4] H05K *3/20*

U.S. Cl. 29—840 6 Claims



1. A method of joining a semiconductor device having at least one conductive surface to a freestanding flexible microcircuit having holes therein to create an electrical connection therebetween comprising the steps of:

a. bonding a metallic, conductive ball upon the at least one conductive surface of the semiconductor device;

b. forming an upwardly extending conductive pigtail from the conductive ball of predetermined diameter and length;

c. positioning the flexible microcircuit atop the semiconductor device such that the conductive pigtail upwardly protrudes through a hole in the microcircuit; and

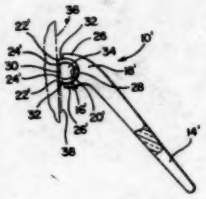
d. bonding a second conductive ball on the portion of the pigtail that protrudes through the hole in the microcircuit.

4,702,004

GLASS RAZOR BLADE AND HANDLE

James Haythornthwaite, 567 Main Road, Hudson, Quebec J09 1IO, Canada

Filed Jul. 24, 1985, Ser. No. 758,465
Int. Cl.[4] B26B *21/14*
U.S. Cl. 30—57 **2 Claims**



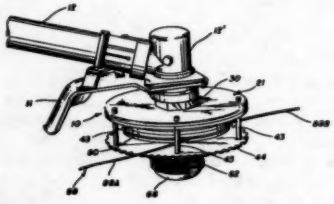
1. A razor, which comprises:
an elongated handle portion; and
a cutting blade portion having first and second opposed sharp cutting edges;
the elongated handle portion and the cutting blade portion, including the first and second opposed sharp cutting edges, all being formed entirely of a glass material;
the elongated handle portion including a pair of arcuate opposed clamping jaws at one end thereof, the arcuate opposed clamping jaws being integral with the remainder of the handle portion and having spaced outer ends; and
the blade portion being of elongated essentially cylindrical construction and being formed with an axially extending slot between spaced opposed ends thereof to define elongated edge portions extending in spaced opposed parallel relationship for the length of the blade portion, the spaced opposed elongated edge portions having respective intersecting surfaces which define the first and second opposed sharp cutting edges thereon, the blade portion being removably received in the arcuate clamping jaws of the handle portion with the opposed elongated portions and the sharp cutting edges thereon projecting beyond the clamping jaws of the handle portion.

4,702,005

APPARATUS FOR CUTTING VEGETATION WITH INCREMENTAL FEEDING OF CUTTING FILAMENT

Charles B. Pittinger, Sr.; Cynthia A. Pittinger, both of 902 North Lake Dr., Weatherford, Tex. 76086, and Charles B. Pittinger, Jr., 320 Cockeys Mill Rd., Reisterstown, Md. 21136

Division of Ser. No. 626,218, Jun. 29, 1984, Pat. No. 4,561,180. This application Oct. 9, 1985, Ser. No. 785,779
Int. Cl.[4] B26B *7/00*
U.S. Cl. 30—276 **4 Claims**



1. A vegetation cutting apparatus comprising a rotary filament cutter head, a circular saw blade attached to said filament cutter head and means for rotating said rotary filament cutter head and said circular saw blade as a unit, said rotary filament cutter head comprising a spindle having upper and lower ends, a circular cap mounted on the upper end of said spindle, a filament spool surrounding said spindle beneath said cap, clutch means interposed between said spindle and said filament spool for rotating said spool upon rotation of said spindle, a plurality of posts depending perpendicularly from said cap and spaced radially outwardly of said spool, a circular cover plate mounted beneath said spool having a central aperture through which said spindle extends and a plurality of radially outwardly spaced apertures aligned with said posts and through which said posts extend, and means securing said cover plate to said spindle for rotation with said spindle, said circular cover plate having saw teeth on its outer periphery and forming said circular saw blade.

4,702,006

HANDLE FOR THE HANDPIECE OF A MEAT TRIMMING KNIFE

Timothy J. McCullough, 833 Aurora Rd., Vermilion, Ohio 44089

Filed Apr. 25, 1986, Ser. No. 856,037
Int. Cl.[4] B26B *7/00*
U.S. Cl. 30—276 **25 Claims**

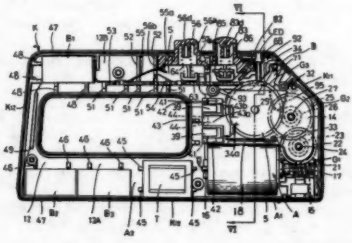
15. An improved handle for the handpiece of a meat trimming knife comprising an elongated one-piece tubular-shaped hollow member having at least three distinct axially extending annular sections, with a first front section having a convex outer surface formed with a series of circumferentially spaced longitudinally extending grooves, with a second intermediate section having a concave outer surface, and with a third rear section having first and second cylindrical outer surfaces, with said second cylindrical outer surface having a larger diameter than said first cylindrical outer surface and larger than said first front section.

4,702,007

RECHARGEABLE ELECTRIC CAN OPENER

Shigeo Nomura, and Syoji Nakanishi, both of Sumoto, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Aug. 14, 1986, Ser. No. 896,367
Claims priority, application Japan, Aug. 19, 1985, 60-181265; Aug. 20, 1985, 60-182414
Int. Cl.[4] B23P *17/00*
U.S. Cl. 30—423 **12 Claims**



1. A rechargeable electric can opener including a casing of reduced thickness containing a motor and a reduction gear mechanism which is connected to a shaft of the motor, a feed wheel for carrying a can, said feed wheel being located on a

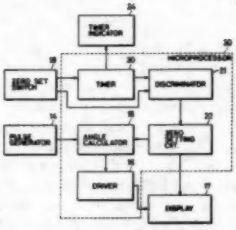
first side face of the casing, said reduction gear mechanism having an output end which is connected to the feed wheel, and a cutter means for opening a lid of the can and for supporting an edge of a can in collaboration with the feed wheel; said can opener comprising an electrical connector plug attached to a second side face of the casing close to a center of gravity of the can opener capable of projecting out from and retracting into said second face, a step-down transformer having a primary side and a secondary side, said primary side being electrically connected to the plug, and a battery connected to the secondary side of the step-down transformer for feeding power to the motor.

4,702,008

ZERO SETTING DEVICE IN SURVEYING INSTRUMENT

Shinichi Suzuki; Masato Hara; Koji Tsuda; Eiji Takasugi; Toshifumi Kinba, and Atsumi Kaneko, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,477
Claims priority, application Japan, Sep. 6, 1985, 60-196995
Int. Cl.[4] G01C *1/00*
U.S. Cl. 33—1 T **6 Claims**



1. A zero setting device in a surveying instrument comprising: a base stand; a rotary stand which is rotatable with respect to said base stand and has collimating means; means for electrically detecting an rotation angle of said rotary stand with respect to said base stand; an angle displaying unit for displaying an angle detected by said detecting means; and a zero setting device, said zero setting device comprising,

a manually-operated zero setting switch,

a timer which starts operating for a predetermined period when said zero setting switch is manually operated a first time; and

zero setting means for setting a display angle on said angle displaying unit to zero only when said zero setting switch is manually operated a second time, said second time occurring during the operation of said timer.

4,702,009

DEVICE FOR MEASURING THE LEVEL OF A MATERIAL STORED IN A TANK

Gaylon L. Dighton, and John W. Lewis, both of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 7, 1986, Ser. No. 848,542
Int. Cl.[4] G01F *23/04*
U.S. Cl. 33—126.6 **3 Claims**

1. An indicator device that measures the level of material in a tank, the tank has a top wall, the device comprises:

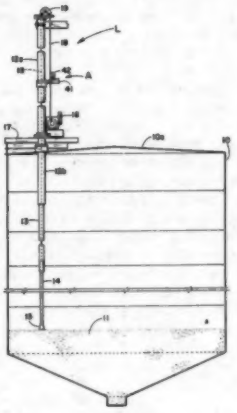
a stationary tubular section that fastens to the top wall of the tank, it has a lower part positioned inside the tank below the top wall, and it has an upper part positioned outside the tank above the top wall;

a telescopic tubular section that depends from and is slidable within the stationary tubular section, and the telescopic tubular section has a lower end defined by a cap having an opening therein;

the indicator device includes a detector means consisting of one light transmitter fiber optic strand, and one light receiver fiber optic strand, and both of these strands run lengthwise through the stationary and telescopic tubular sections;

the indicator device includes a source of light positioned adjacent to the stationary tubular section, one end of the light transmitter strand is connected into the source of light, and the opposite end of said strand is a free end that is positioned outside of the cap that defines the lower end of the telescopic tubular section;

the indicator device includes a light sensor means, the sensor means is positioned adjacent to the stationary tubular section, one end of the light receiver strand is connected into the sensor means, the opposite end of said strand is a free end that is positioned outside of the cap at the lower end of the telescopic tubular section, and a space is defined between the free end of the light receiver strand and the free end of the light transmitter strand;



the upper part of the stationary tubular section has a top end, a cable drum is positioned above the top end of the first tubular section, a cable string on the drum has a free end, the free end of the cable string passes down through the stationary and telescopic tubular sections, and fastens into the cap at the lower end of the telescopic tubular section;

the indicator device includes a device for counting the number of revolutions made by the cable drum from a given point, and the counting device is attached to the cable drum;

wherein, the cable drum is operated in a forward sequence, which unwinds the cable string from a starting point and lowers the telescopic tubular section until the free ends of the light transmitter and light receiver fiber optic strands are submerged below the surface of the material in the tank, the light received by the light sensor means is blocked, a reading is taken from the counting device to determine the distance traveled by the cable string from the starting point, and this distance indicates the level of the material in the tank.

4,702,010

TESTING THE INTERNAL GEOMETRY OF TUBES AND PIPES

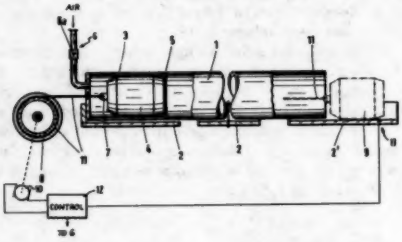
Kurt Elbracht, Ratingen, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Nov. 26, 1986, Ser. No. 935,050

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3542163

Int. Cl.[4] G01B 5/12

U.S. Cl. 33—178 F 3 Claims



1. Apparatus for testing the internal geometry of tubes or pipes being placed in a particular test station comprising:

an adapter sleeve provided for end to end abutment with the tube or pipe to be tested and containing removably a measuring mandrel to be propelled through the tube or pipe to be tested;

means for applying pressurized air to said adapter sleeve to obtain a propelling of said measuring mandrel out of the adapter sleeve and into and through that tube or pipe;

a tape, cable or rope fastened to said mandrel and being wound on a drum to be unreeled therefrom as the mandrel is propelled through the tube or pipe to be tested;

reversible drive means connected to the drum and operated for brake operation tending to retard said mandrel upon being propelled through said tube or pipe to be tested without impeding propagation of the mandrel through the tube or pipe to be tested and further provided for reversing permitting retraction of the mandrel through the tube or pipe back into the adapter sleeve; and

switch means for disconnecting the pressure source from the adaptor sleeve.

4,702,011

SEXTANT HAVING A MICROPROCESSOR FOR CALCULATING THE POSITION OF HEAVENLY BODIES

Gordon B. Sigley, 3 O'Grady Drive, Paradise Point, Queensland, Australia (4127)

PCT No. PCT/AU86/00011, § 371 Date Sep. 15, 1986, § 102(e) Date Sep. 15, 1986, PCT Pub. No. WO86/04408, PCT Pub. Date Jul. 31, 1986

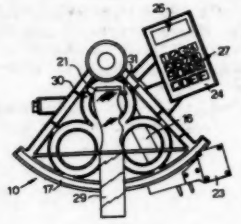
PCT Filed Jan. 16, 1986, Ser. No. 916,496

Claims priority, application Australia, Jan. 16, 1985, PG8907

Int. Cl.[4] G01C 1/08; G02B 23/12

U.S. Cl. 33—268 9 Claims

1. A sextant of the type having a support frame including a graduated arc, an eye piece mounted on said support frame, a split horizon mirror mounted in a fixed position on said support frame in the line of sight of said eye piece, an index arm pivotally supported on said support frame, an index mirror fixedly supported on said index arm, micrometer means mounted on said index arm and cooperable with said graduated arc to vary the pivotal position of said index arm and said index mirror and thus the position of an image of heavenly body being observed via said horizon mirror through said eye piece, and wherein the improvement comprises a stepping motor having a drive shaft, means supportig said stepping motor on said index arm, means for coupling said drive shaft of said stepping motor to said micrometer means, and control means for controlling the operation of said stepping motor, said control means including pulse generating means for generating a plurality of pulses, first switch means selectively actuable to apply said pulses from said pulse generating means to said stepping motor to cause rotation thereof in discrete steps and through said micrometer means, pivotal movement of said index arm and said index mirror so that the image of said heavenly body reflected through said index and horizon mirrors as viewed through said eye piece may be moved towards the horizon, monitoring means for monitoring said pulses applied to said stepping motor upon actuation of said first switch means, said monitored pulses being proportional to the angle of movement of said index arm and index mirror, means for storing predetermined data relating to the position of said heavenly body, chronometer means, calculating means for calculating sextant sight position from celestial navigation equations, and second switch means, said second switch means being adapted to be actuated when said image of said heavenly body reaches the horizon as viewed through said eye piece, actuation of said second switch means causing said monitored pulses applied to said stepping motor and indicative of the altitude angle of said heavenly body and said chronometer means at the time of actuation of said second switch means to be read by said calculating means, and said calculating means being operable to calculate from said readings and said stored data, said sextant sight position, and visual display means for displaying said sextant sight position.



4,702,012

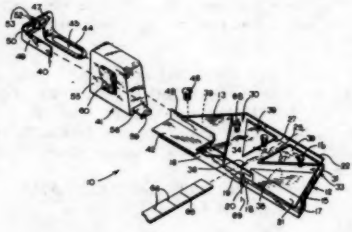
MARKING AND MEASURING TOOL

Dana K. Miller, 5237 Bouldercrest Rd., Ellenwood, Ga. 30049

Division of Ser. No. 851,249, Apr. 14, 1986, Pat. No. 4,642,898. This application Jan. 27, 1987, Ser. No. 6,750

Int. Cl.[4] B43L 7/06

U.S. Cl. 33—464 6 Claims



1. A marking and measuring tool comprising a housing that has a flat side face adapted to be placed flushly against a side of an object to be marked or measured and a plurality of substantially coplanar guide channels that extend from adjacent said side face at a plurality of angles with respect thereto with said channels merging adjacent said side face and with a side of each channel extending towards a common reference line lying

substantially in the plane of said flat side face; and a bar of a size and shape adapted to be slid within said guide channels.

4,702,013

PROBE FOR SENSING CONTACT VIA ACCELERATION

David R. McMurtry, Wotton-Under-Edge, Great Britain, assignor to Renishaw plc, England

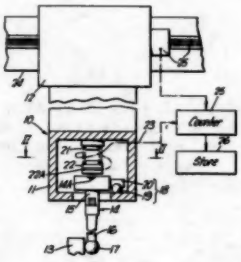
PCT No. PCT/GB85/00586, § 371 Date Jul. 28, 1986, § 102(e) Date Jul. 28, 1986, PCT Pub. No. WO86/03829, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 16, 1985, Ser. No. 897,767

Claims priority, application United Kingdom, Dec. 17, 1984, 8431746

Int. Cl.[4] G01B 7/28

U.S. Cl. 33—558 **19 Claims**



1. A contact-sensing prove for use in apparatus for measuring the dimensions of workpieces, comprising:

a fixed part adapted to be mounted in the apparatus;

a movable part, including a base portion and a stylus having a free end for engaging the workpiece during a measuring operation, the free end being supported in a position having a fixed relationship relative to the base portion via a support path extending from the base portion to the free end;

support means for supporting the base portion so that the movable part is in a rest position on the fixed part;

bias means for urging the movable part into said rest position, the movable part being displaceble from the rest position by a displacing force in opposition to the bias means, the bias means acting to return the movable part to the rest position upon cessation of the displacing force;

sensing means for sensing when the free end of the stylus engages the workpiece, comprising an accelerometer having first and second portions, said first portion being supported by said movable part to participate in movement of said movable part relative to said fixed part, said second portion being free to yield in opposition to a yielding resistance relative to said first portion and relative to said support path, thereby permitting said sensing while maintaining said fixed relationship between said stylus free end and said base portion.

4,702,014

METHOD OF AND AN APPARATUS FOR DRYING FIBROUS MATERIAL

Fritz Karrer, Strandvägen 37, 11456 Stockholm, Sweden

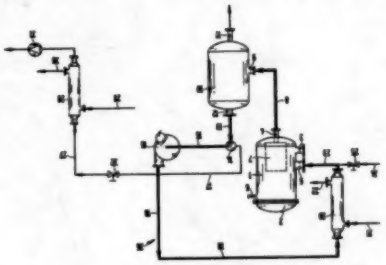
Filed Jun. 24, 1985, Ser. No. 748,151

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1984, 3423388

Int. Cl.[4] F26B 7/00

U.S. Cl. 34—15 **14 Claims**

1. A method of drying a textile fibrous material containing a residual liquid, comprising the steps of heating the fibrous material exclusively by superheated steam circulated by circulation means through a circulation conduit, a vessel containing the fibrous material and a reheater, applying underpressure by a vacuum pump to the heated material at subatmospheric pressures so that the residual liquid contained within the fibrous material vaporizes, withdrawing vaporized liquid from the heated material together with the circulating steam, and intermittently withdrawing a portion of the steam from the circulation conduit corresponding to the vaporized liquid by



the vacuum pump through a pressure control valve which opens as the pressure rises in the circulation conduit to a predetermined higher subatmospheric value and which closes as the pressure drops to a predetermined lower subatmospheric value.

4,702,015

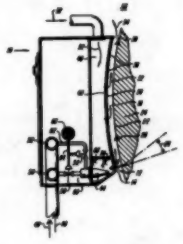
EVAPORATIVE-COOLING APPARATUS AND METHOD FOR THE CONTROL OF WEB OR WEB-PRODUCTION MACHINE COMPONENT SURFACE TEMPERATURES

Bruce F. Taylor, Auburn, Mass., and Kenneth G. Hagen, Cape Elizabeth, Me., assignors to Thermo Electron - Web Systems, Inc., Auburn, Mass.

Continuation-in-part of Ser. No. 834,755, Feb. 28, 1986. This application Sep. 22, 1986, Ser. No. 909,968

Int. Cl.[4] F26B 3/04

U.S. Cl. 34—20 **13 Claims**



1. An apparatus for use in the non-contact cooling of a web or a machine component in contact with the web, said apparatus being positioned adjacent said web or component to be cooled, said apparatus comprising:

means for creating fog within said apparatus, said fog having a temperature lower than the temperature of said web or component to be cooled;

an opening in said apparatus, said opening including a passageway through which fog is forced from said chamber into direct contact with the surface to be cooled;

means for supplying and carrying air to carry said fog to the surface to be cooled, said supplying means being located a short distance upstream from said means for creating fog, said carrying air also exhausting vapor created by the contact of said fog with said web or machine component from a region adjacent said web or machine component.

4,702,016

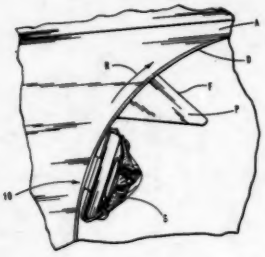
APPARATUS FOR DRYING SHOES IN A DRYER

Samuel H. Grigsby, and Beverly A. Grigsby, both of Rte. 11, Box 250, London, Ky. 40741-8416

Filed Aug. 29, 1986, Ser. No. 902,434

Int. Cl.[4] F26B *3/04, 11/04*

U.S. Cl. 34—33 **21 Claims**



20. A method of drying shoes in an automatic clothes dryer having a rotating drum with paddles by utilizing a shoe drying apparatus comprising the steps of:

fastening a shoe to a shoe mounting surface of said shoe drying apparatus, and

releasably attaching the shoe drying apparatus and shoe securely to an inner circumferential surface of said drum so as to extend in a substantially radial orientation for more efficient drying of said shoe while minimizing interference of said apparatus and shoe with tumbling action of other clothes in said dryer.

4,702,017

DRYER FOR DRYING WASHED GLASS PLATES

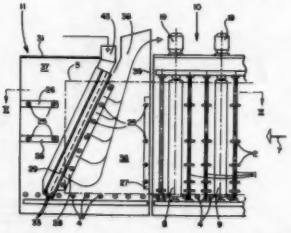
Karl Lenhardt, Heuhausen-Hamberg, Fed. Rep. of Germany, assignor to Lenhardt Maschinenbau GmbH, Neuhausen-Hamberg, Fed. Rep. of Germany

Filed Aug. 27, 1986, Ser. No. 900,673

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 8524541[U]

Int. Cl.[4] F26B *15/00*

U.S. Cl. 34—107 **10 Claims**



1. A dryer for drying washed glass plates as they travel in a housing, which has a dryer entrance slot and a dryer exit slot and contains a horizontal conveyor for the glass plates, which conveyor comprises bottom members for supporting the bottom edge of said plate glass and backing elements for supporting the sides of said glass plate, said bottom members and said backing elements defining a plane of travel for the glass plates, said dryer also comprises elongate blast nozzles, which are respectively disposed on both sides of the plane of travel for the glass plates and are upwardly inclined opposite to the direction of travel and have air exit slots which face the plane of travel for the glass plates and extend from a level which is close to the level of the bottom members in a direction which is upwardly inclined opposite to the direction of travel, shields are provided and extending between respective blast nozzles and respective walls of the housing to define two chambers between said blast nozzles and said entrance slot , and an exhaust air outlet provided in said housing for exhausting humid air from said chambers , characterized in that the top end of each blast nozzle is spaced from the entrance end wall of the dryer and the exhaust air opening is formed in the top wall of the housing between the upper ends of the blast nozzles and the entrance end wall of the dryer.

4,702,018

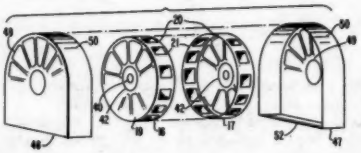
OPEN AIR CLOTHES DRYER

Allen M. Hastings, 4700 Fawnwood Cove, Austin, Tex. 78735

Filed Jan. 23, 1987, Ser. No. 6,180

Int. Cl.[4] F26B *11/04*

U.S. Cl. 34—130 **6 Claims**



1. A clothes dryer assembly comprising the combination of a drive motor having an output shaft;

an endless drive member;

a drum including first and second drum halves of molded polymeric material, each said drum half including

a generally flat first wall and a cylindrical second wall with a circular edge, said second wall being unitarily formed on said first walls,

means defining a large number of small holes passing through said first and second walls,

means on said circular edge for engaging the edge of the other drum half, and

an annular groove around said second wall for receiving said endless drive member;

a housing including first and second housing halves of molded polymeric material, each said housing half including

a flat third wall having a larger area than each said first wall and a fourth wall unitarily formed on and perpendicular to said third wall, said fourth wall having edges shaped to mate with the other housing half,

a metal bottom frame molded into a portion of said housing half, and

support means attached to said metal frame for supporting said assembly;

roller means mounted on said housing for supporting said drum so that said drum is rotatable about its central axis within said housing;

means on one of said drum halves defining an access opening to permit insertion and removal of clothing to be dried;

means on one of said housing halves defining a door opening aligned with said access opening; and

means on said housing for supporting said drive motor, said endless drive member being coupled to said output shaft and said drum to rotate said drum.

4,702,019

APPARATUS FOR COOLING HIGH-TEMPERATURE PARTICLES

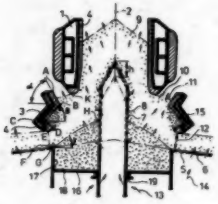
Masayoshi Tsuruno, Funabashi, and Michihiko Horie, Nagareyama, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha and Ishikawajima Plant Engineering Kabushiki Kaisha, both of Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,346

Claims priority, application Japan, Jul. 17, 1985, 60-156019; Jul. 17, 1985, 60-156020

Int. Cl.[4] F26B *17/14*

U.S. Cl. 34—168 3 Claims



1. In an apparatus for cooling high-temperature particles having

a first cooling zone comprising a vertical guide tube which temporarily holds the high-temperature particles fed therein and prevents rapid spread of said high-temperature particles in radially outward directions, a conical or pyramidal body which has a large number of air passage holes and is disposed spaced below said guide tube such that an imaginary vertex of said conical or pyramidal body is coaxially on an axis of said guide tube and whose inclination angle is gentle, and a motion acceleration device which has a large number of air passage holes and which extends from the imaginary vertex of said conical or pyramidal body into said guide tube and is vertically reciprocable so that displacement in the radially outward directions of said high-temperature particles along an outer surface of said conical or pyramidal body is facilitated, and a second packed layer type cooling zone disposed below said first cooling zone for gradually cooling said high-temperature particles while said high-temperature particles which have been rapidly cooled in said first cooling zone move downwards, the improvement which comprises

a vertical outer tube interposed between said guide tube and said conical or pyramidal body coaxially of said guide tube to constitute together with said guide tube a double guide tube system, said outer tube having an upper end positioned slightly higher than a lower end of said guide tube so that a free surface of a high-temperature particle layer formed in an annular opening defined between said guide tube and said outer tube can be stabilized, and a passage for said high-temperature particles defined in said outer tube, said passage being gradually converged toward a layer thickness control gap defined between the lower end of said outer tube and said conical or pyramidal body so that said high-temperature particles which move from said outer tube to said conical or pyramidal body can be be applied with a pressure and compacted.

4,702,020

CURLING SLIDER

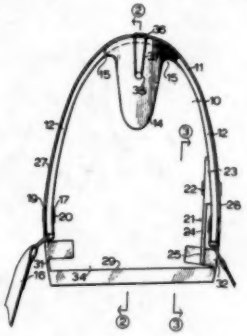
Henry Kroeger, 1372 Henderson Highway, Wpg. Man., Canada R2G 1MB

Filed Aug. 26, 1986, Ser. No. 900,518

Int. Cl.[4] A43B *3/12*

U.S. Cl. 36—11.5 17 Claims

1. A curling slider comprising a plate formed from stainless steel which is of a thickness to remain rigid against flexing forces applied by the foot of the wearer's foot and to have an upcurved edge around the periphery thereof at least at front and sides thereof so as to allow sliding on ice without scoring the ice, said stainless steel plate being hard chromed on at least an under surface thereof and a rigid plastics inner liner having a substantially planar wall for underlying at least a front sole



portion of a shoe of a wearer, an upstanding side wall means around at least the toe and side portions of the periphery of the wall and means for attaching said liner to a shoe of the wearer, said plate including means for attachment thereof to said liner at an underside of the planar wall, wherein said plate is separable from said liner.

4,702,021

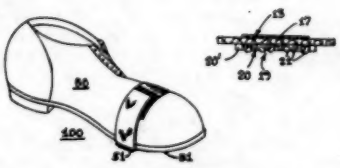
SHOE TRACTION APPARATUS

Emmet H. Cameron, 1950 Yale Ave., Salt Lake City, Utah 84108

Filed Oct. 7, 1986, Ser. No. 916,147

Int. Cl.[4] A43C *15/02, 15/06*

U.S. Cl. 36—62 1 Claim



1. A shoe traction apparatus consisting of:

an elongated strap member provided with releasable engaging means on opposite ends;

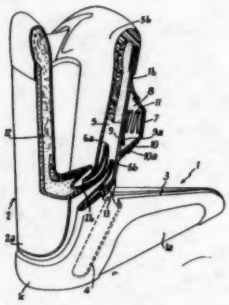
an upper frictional unit formed on the top of the strap member intermediate the ends; and,

a lower composite frictional unit formed on the bottom of the strap member intermediate the ends; wherein, the composite frictional unit comprises a relatively hard frictional component and a relatively soft frictional component; wherein, the relatively soft frictional component partially and wholly surrounds different portions of the relatively hard frictional component, and, wherein, the relatively hard frictional component comprises a plurality of discrete edible seed particles; whereby individual edible seed particles will become disengaged from the relatively soft frictional component at intervals during use to provide a food source for birds.

4,702,022
SKI BOOT

Pierre O. Porcher, 10 rue du docteur Lancereaux, 75008 Paris, France

Filed Oct. 14, 1986, Ser. No. 918,259
Claims priority, application France, Oct. 11, 1985, 85 15085
Int. Cl.[4] A43B 5/04
U.S. Cl. 36—119 10 Claims



1. A ski boot comprising an outer shell suitable for receiving an inner boot and fitted with means for attachment to a ski and to an inner boot, said inner boot comprising:

a substantially rigid casing comprising first and second portions which are hinged to each other, the first portion comprising a sole and a housing for receiving the front of the foot, which housing is extended upwardly by a shin-covering section, the second portion of the substantially rigid housing constituting a tongue which is connected to the rear of the first portion in the vicinity of the heel and which is suitable for rocking towards said shin-covering section;

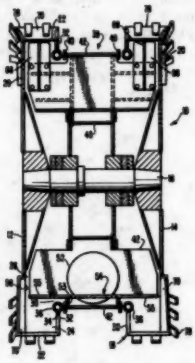
said tongue and said shin-covering section being interconnected by flexible double walls extending a vacuum chamber provided in the thickness of one of said inner boot portions, said double walls forming respective bellows-like folds in said vacuum chamber when said inner boot portions are moved towards each other, thereby penetrating farther into said vacuum chamber with increasing vacuum, and thus serving to hold said boot portions close to each other, and constituting, in the absence of a vacuum, a connection between said portions of sufficient length to enable them to be moved far enough apart to allow a foot to be inserted into the inner boot.

4,702,023
CUTTER WHEEL FOR A DREDGE

Alexander W. K. McDowell, Annapolis, Md., assignor to Ellicott Machine Corporation, Baltimore, Md.

Filed Sep. 30, 1986, Ser. No. 913,459
Int. Cl.[4] E02F 3/88
U.S. Cl. 37—66 11 Claims

1. A cutter wheel for a dredge comprising a pair of axially spaced substantially annular plates arranged on a common, horizontal axle for rotation in unison, scoops uniformly circumferentially spaced about the peripheries of said plates, each scoop being defined by a closed outer side wall integral with a respective plate, a closed top wall extending axially inwardly from said outer side wall, an open mouth, bottom and rear and a substantially open inner side, the inner sides of the scoops on one of said plates being axially spaced from the inner sides of the scoops on the other of said plates, a hopper in the axial spacing between the inner sides of the respective scoops, said hopper being defined by radially spaced, arcuate inner and outer walls having an axial width complementary to the spacing between the inner sides of said scoops, upper and lower circumferentially spaced, radial end walls extending between said radially spaced inner and outer walls of said hopper, and axially spaced open outer sides arranged so that the open inner sides of said scoops align therewith as said plates are rotated,

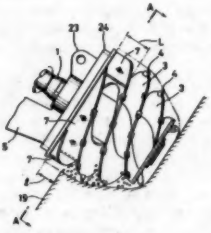


and a suction pipe extending through said lower radial end wall for removing from said hopper spoil flowing axially thereinto through the substantially aligned open sides of said scoops and said hopper, respectively.

4,702,024
HELICAL DREDGE CUTTER HEAD WITH SCOOP-IN PLATES

Toyoaki Shiba; Seiichi Goto, and Keishi Ito, all of Tokyo, Japan, assignors to Toyo Construction Co., Ltd., Osaka, Japan

Filed Mar. 13, 1986, Ser. No. 839,290
Claims priority, application Japan, Dec. 28, 1985, 60-199863[U]
Int. Cl.[4] F02F 3/92
U.S. Cl. 37—67 8 Claims



1. A dredging helical cutter comprising:

at least one rotary helical vane having a send-out end portion;

a rotary drive shaft for rotating said helical vane about the axis of said drive shaft to cause material to be conveyed to said send-out end portion;

a suction tube having an opening in the vicinity of the send-out portion;

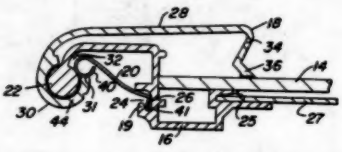
scoop-in means fixed to said at least one rotary vane for conveying material from said send-out end portion to said opening of said suction tube, said scoop-in means comprising a corresponding at least one upstanding, curved plate concentric with said axis and affixed to the periphery of said send-out end portion of said at least one rotary vane.

4,702,025

DISPLAY FRAME

Vincent Mace, Springfield, Pa., assignor to M & M Displays, Philadelphia, Pa.

Filed Nov. 25, 1985, Ser. No. 801,638
Int. Cl.[4] G09F 1/12
U.S. Cl. 40—156 12 Claims



1. A display frame for holding a sign, poster, or the like, said frame comprising a plurality of frame sections whose adjacent ends are joined to each other to form a polygonal shape, with each of said frame sections comprising:

(a) a first rear structure comprising a cylindrically shaped portion and a spring receiving means spaced therefrom on said rear structure, facing said cylindrically shaped portion;

(b) a second front structure comprising a first forward panel portion having disposed along a first edge thereof and depending therefrom a semi-circularly shaped structure adapted for mounting in orientation around said cylindrically shaped portion of said cylindrically shaped portion of said first rear structure and pivotally movable thereon over a predetermined arc between fully open and fully closed positions, whereby the open section of said semi-circularly shaped structure is disposed facing said spring receiving means of said first rear structure when said second front structure is in said closed position; and

(c) tensioned spring means having a first end disposed within the spring receiving means of said first rear structure and having a circularly shaped second end disposed within the open section of said semi-circularly shaped structure and biased against a leading edge of said semi-circularly shaped structure when said second front structure is in a closed position, and biased against a solid section of said semi-circularly shaped structure for at least a substantial portion of said predetermined arc of pivotal travel of said second structure when said second front structure is not in a closed position

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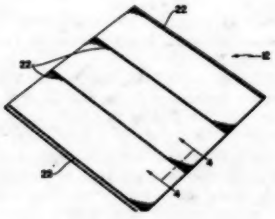
4,702,026

METHOD OF MAKING PAGES FOR PHOTO ALBUMS AND PAGES THEREBY FORMED

William L. Shaine, Westhampton, Mass., assignor to SPM Manufacturing Corporation, Holyoke, Mass.

Filed Mar. 10, 1986, Ser. No. 838,324
Int. Cl.[4] G09F 1/10
U.S. Cl. 40—159 13 Claims



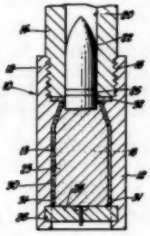
10. A page for a photo album comprising a first sheet of biaxis-oriented polypropylene, at least two spaced, substantially parallel, narrow lines of a pressure-sensitive adhesive on said first sheet and a second sheet of biaxis-oriented polypropylene overlayed on said first sheet and adhesively secured thereto with said pressure sensitive adhesive.

4,702,027

THERMAL LINER FOR GUN FIRING CHAMBER

Edward T. Stanley, 8210 10 Mile Rd., Apt. B-18, Centerline, Mich. 480915

Filed Aug. 18, 1986, Ser. No. 900,129
Int. Cl.[4] F41C 21/12; F41F 17/08
U.S. Cl. 42—76.02 2 Claims



2. In a gun designed to fire a round of ammunition comprised of a projectile and attached combustible cartridge, said cartridge being completely combustible; said gun comprising an annular barrel section defining a firing chamber designed to receive the cartridge, a tube section defining a guide surface for the projectile as it travels out of the gun, and a transversely movable breech block designed to removably close the aft end of the firing chamber when a cartridge is disposed therein:

the improvement comprising a tubular liner snugly received in the firing chamber in pressure-transmitting relation to the firing chamber wall; said liner being formed of a material having thermal insulation properties whereby the liner offers substantial resistance to flow of heat from the firing chamber into the firing chamber wall;

said liner extending the full axial length of the firing chamber between the gun tube section and the breech block; said liner being telescopically received in the firing chamber so that the outer surface of the liner has a slidable slip fit on the inner surface of the firing chamber wall, whereby the liner can be removed and replaced with another similar liner; said liner having at least two circumferentially spaced openings (31) in its side surface near its after end for engagement with a pulling implement when it is desired to remove the liner from the firing chamber; said breech block having an open position wherein the liner can be removed from the firing chamber without disconnecting the breech block from its normal operating condition on the gun.

4,702,028

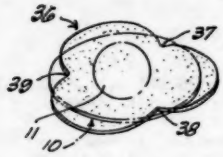
PATCH FOR MUZZLE LOADING RIFLES

Ronald R. Dahlitz, 2232 Angelcrest Dr., Hacienda Heights, Calif. 91745

Filed Jan. 7, 1987, Ser. No. 1,211
Int. Cl.[4] F41C 27/00
U.S. Cl. 42—90 8 Claims

1. An improved patch for use with muzzle-loading firearms of the type fabricated from a circular swatch of fabric, wherein the improvement comprises:

at least three identical, symmetrical indentations formed in the periphery of said patch, each of said symmetrical indentations being equally spaced from the center of said patch.

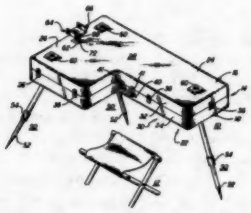


4,702,029

COMBINATION SHOOTER'S BENCH AND GUN CARRYING CASE

Richard L. DeVaul, 7958 DeVaul Rd., Kirkville, N.Y. 13082, and Gerald P. Vaikness, R.D. #1, Quarry Rd., Chittenango, N.Y. 13037

Filed Oct. 29, 1986, Ser. No. 924,311
Int. Cl.[4] F41C *29/00*
U.S. Cl. 42—94 **10 Claims**



1. A combination gun case and shooter's bench comprising a casing having first and second casing halves suitably dimensioned to contain a target rifle, each said casing half being formed of a flat horizontal panel and a side wall, the side walls being hinged to close together in clamshell fashion, each of said flat horizontal panels including a plurality of leg mountings formed on an outer surface thereof and a gun rest sleeve thereon extending normal thereto;

a plurality of adjustable-length legs including means for detachably mounting the legs to respective leg mountings on either of said flat horizontal panels; and

a gun rest having a yoke for supporting said target rifle for shooting and a post supporting said yoke, the post being insertable into the gun rest sleeve on either of said casing halves.

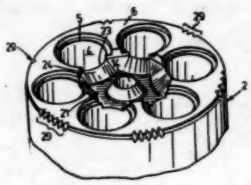
4,702,030

REVOLVER WITH FIRING ORDER INDICATOR NOTCHES

Paris H. S. Schreiber, General Delivery, Port Carling, Ontario, Canada P0B 1J0

Division of Ser. No. 704,584, Feb. 22, 1985. This application Aug. 21, 1986, Ser. No. 898,523
Int. Cl.[4] F41C *1/00*
U.S. Cl. 42—1.02 **3 Claims**

1. A revolver with a firing mechanism and a cylinder containing a plurality of firing chambers, the cylinder being moveable between a loading position for inserting live cartridges into the firing chambers and a battery position for firing, wherein said cylinder has a sequential series of indicators corresponding to a firing sequence of the firing chambers from a first firing chamber to a last firing chamber, which indicators are discernible by touch when the cylinder is in the battery position whereby the location relative to the firing mechanism of each of the firing chambers in the firing sequence can be discerned by touch.

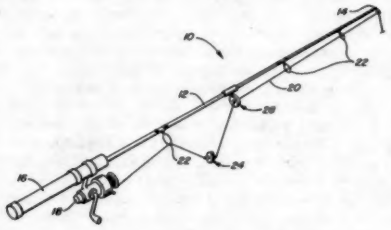


4,702,031

BITE INDICATOR FOR FISHING GEAR

David W. Sousa, 41903 Corte Santa Barbara, Fremont, Calif. 94539

Filed Jun. 25, 1986, Ser. No. 878,428
Int. Cl.[4] A01K *97/12*
U.S. Cl. 43—17 **21 Claims**



1. A bite indicator for fishing gear including a rod, reel means mounted on a rearward portion of the rod and fishing line extending forwardly from the reel through at least one eyelet affixed to said rod, the bite indicator comprising a weighted mass having a balancer tube and an opening through which the fishing line is loosely threaded, the weighted mass being arranged adjacent the one eyelet whereby the weighted mass is suspended upon the line and causes the line to sag when extended for fishing so that tension produced in the line by a bite causes the weighted mass to move as a visual bite indicator, the balancer tube and weighted mass comprising means securable to the one eyelet during casting to avoid interfering with forward passage of the line from the reel.

4,702,032

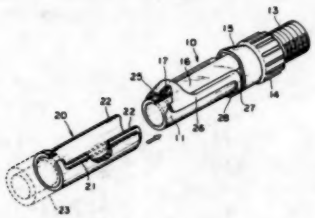
CYLINDRICAL REEL SEAT FOR A FISHING ROD

Ryuichi Ohmura, Shizuoka, Japan, assignor to Fuji Kogyo Co., Ltd., Shizuoka, Japan

Filed Mar. 10, 1986, Ser. No. 837,819
Claims priority, application Japan, Jun. 17, 1985, 60-90086[U]
Int. Cl.[4] A01K *87/00*
U.S. Cl. 43—22 **5 Claims**

1. A cylindrical reel seat for a fishing rod comprising: a cylindrical body having at its top a reel base mount, one end of said mount having a cavity which receives one end of a reel base; said cylindrical body being adapted to receive a relatively soft member at a circumference thereof; said relatively soft member having a trough shaped portion with an annular rear end; a slidable sleeve having an open end, said slidable sleeve being adapted to fasten another end of said reel base to said cylindrical body; a nut adapted to slide said slidable sleeve

forward and backward; flanges integrally formed on said cylindrical body to receive projections connecting to said trough



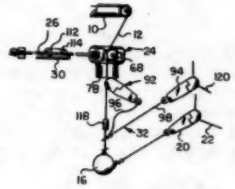
shaped portion of said soft member; and said soft member covering said cylindrical body except said reel base mount.

4,702,033

DOWNRIGGER CABLE ACCESSORY

Byron Shaw, Davison, Mich., assignor to Blue Water Research, Inc., Lapeer, Mich.

Filed Nov. 17, 1986, Ser. No. 931,526
Int. Cl.[4] A01K *91/06*
U.S. Cl. 43—43.12 **9 Claims**



1. A downrigger cable accessory for use with a fishing line downrigger including a weight suspended by a cable from a boom to retrieve the weight when raised to adjacent the boom, comprising, in combination, a body, a cable passage defined through said body for receiving the downrigger cable, a roller rotatably supported within said body having an axially extending periphery and lateral sides intersecting said periphery, said roller periphery including a lateral region adjacent each lateral side and a central region intermediate said lateral regions, opposed recesses defined in said body adjacent each roller lateral side receiving the adjacent roller periphery lateral region whereby said roller periphery lateral regions are shielded within said recesses and are inaccessible to engagement with the downrigger cable, said roller periphery central region constituting a portion of said body cable passage, and a flexible cord attached to the body to permit remote displacement of the body to engage the cable with said roller periphery central region.

4,702,034

EDGING ASSEMBLY

Brian D. Ferguson, Kenmore, and Phillip B. Jackson, River Hills, both of Australia, assignors to Aqua-Edge Industries Australia Pty. Ltd, Queensland, Australia

Continuation-in-part of Ser. No. 623,970, Jun. 25, 1984, abandoned. This application May 22, 1986, Ser. No. 866,153
Int. Cl.[4] A01G *1/00*
U.S. Cl. 47—33 **5 Claims**

1. A flexible edging and sprinkler assembly for gardens capable of following a serpentine path including:

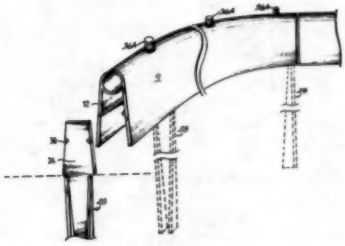
(a) a plurality of elongate supports adapted to be retained in the ground wherein each support comprises shank and a head portion, said head portion having an opposed pair of spaced-apart side edges, each side edge, having a side edge recess and a taper extending outwardly from top to bottom; and

(b) a continuous integral cover strip formed from flexible resilient material having:

(i) a top conduit having a plurality of spaced water outlets; and

(ii) a pair of side flanges divergingly depending from the top conduit and each having:

(a) an outwardly extending rib whereby a respective rib is engageable in snap fit relationship with a plurality of said side edge recesses; and



(b) a taper similar to the taper of the side edges to define, between the side flanges, a recess for receiving support head portions so that the spaced-apart side edges of each head portion face in a direction transverse to the cover strip, each side flange in the pair of side flanges comprising: a side flange surface facing toward the other side flange in the pair and wherein the side flange surfaces extend on respective opposite sides of the head portion, and

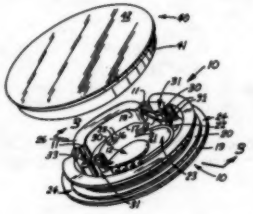
(iii) hose coupling means for coupling a hose to the top conduit.

4,702,035

LINE STORAGE CONTAINER

George R. Palm, Rte. #1, Baudette, Minn. 56623

Filed Feb. 2, 1987, Ser. No. 9,821
Int. Cl.[4] A01K *97/06*
U.S. Cl. 43—57.1 **20 Claims**

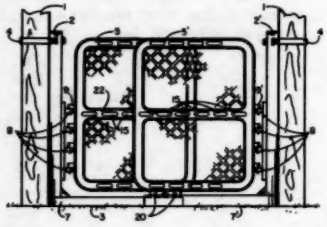


1. A storage container for a flexible, elongated line having a bulky member on one end thereof, comprising a spool having: a first cylinder of relatively short length with first and second ends; first and second flanges extending radially outwardly from the first and second cylinder ends respectively; and wall means extending substantially across said first cylinder end, defining with the cylinder a storage cavity; a portion of the cylinder and the second flange having a discontinuity whereby the bulky member may be stored within said cavity with the line passing through the discontinuity and wound about the spool.

4,702,036
DOORWAY SAFETY GATE APPARATUS

Stanley A. Johnson, 2575 Maple Hill Dr., Brookfield, Wis. 53005

Filed Jun. 4, 1986, Ser. No. 870,550
Int. Cl.[4] E06B 3/68
U.S. Cl. 49—55 7 Claims



1. Doorway safety gate apparatus wherein the improvement consists of:

(a) two gate segments and gate vertical frame mounts
(b) said segments to overlap when closed; and
(c) hinges mounted on outer vertical edge of each gate segment,
(d) said hinges consisting of
(e) hinge pins pointed downward and mounted on edge of each gate segment, and said hinge pins of each gate segment mounted in
(f) hinge pin sockets mounted on inside face of door frame pillars, and
(g) keyways in said hinge pin sockets and
(h) hinge pin key segments on bottom end of said hinge pins and
(i) gate locking means comprising a rotatable locking pin in a
(j) slot of center bar of each gate segment, and
(k) said locking pin comprised of
(l) pin heads attached to each end of locking pin center section and
(m) one of said pin heads having a wide and narrow dimension and a
(n) pin head having a base dimension greater than said slots of center bars of gate segments and
(o) located on opposite end of said locking pin center section from pin head having a wide and narrow dimension.

4,702,037
SERVICE WINDOW

John R. Hollowell, 22179 Long Blvd., Dearborn, Mich. 48124, and John F. Hollowell, 6526 Sharon Dr., Garden City, Mich. 48135

Filed Jul. 30, 1986, Ser. No. 891,745
Int. Cl.[4] E05F 17/00; E05D 7/08; E06B 3/00
U.S. Cl. 49—114 41 Claims

27. A service window comprising:

a window frame;

first and second window panels secured to said frame for rotation about first and second generally vertical hinges between open and closed positions;

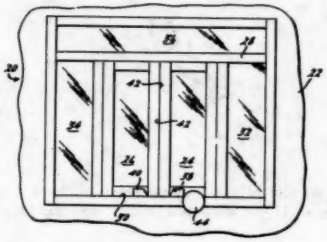
first hinge actuator secured to said first hinge for rotation with said hinge about a common axis with said first hinge;

second hinge actuator secured to said second hinge for rotation with said hinge about a common axis with said second hinge;

rigid tie rod connector between said first and second hinge actuators for translating rotation of said first hinge into counterrotation of said second hinge;

push rod extending generally outwardly from the plane of said panels when in said closed position for receiving window-actuating forces;

direction changing linkage means coupled between said push rod and said first hinge actuator for translating said window-actuating forces into rotational movement of said first hinge;

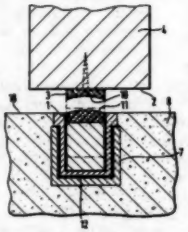


wherein said direction changing linkage means comprises a one piece pivot member articulated to said push rod means at a first point on said pivot member; and an extension bar means rigidly secured to said first hinge actuator and articulated to said pivot member at a second point on said pivot member whereby displacement of push rod causes rotational movement relative to said second point.

4,702,038
DOOR SEAL PACKING, ESPECIALLY FOR DOORS WITH OR WITHOUT THRESHOLDS

Harry Frey, Untere Gasse 24, 8950 Kaufbeuren-Oberbeuren, Fed. Rep. of Germany

Filed Sep. 22, 1986, Ser. No. 909,951
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533782
Int. Cl.[4] E06B 7/16
U.S. Cl. 49—478 7 Claims



1. A door seal assembly suitable for use with doors having door frames with or without a threshold, comprising two mutually confronting members, being a first elongate sealing member and a second elongate sealing member, one of said members being securable to an underneath edge surface of the door and the other one to the confronting surface of a floor at least one of said first and second members comprising a permanent magnet and the other of said first or second members being selected from a permanent magnet and a portion of magnetizable material, wherein one of said members, when the door is in the closed position, moves in a direction at right angles to the direction of closure of the door wherein the first and second sealing members extend parallel to each other when the door is in the closed condition, guide means are provided to guide the movement of said one of the sealing members and wherein at least said one of said sealing members has opposite magnetic poles at its respective ends providing an opposite pole arrangement between the sealing members in a

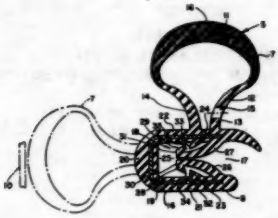
lengthwise direction of said edge surface of the door whereby, in closed position of the door, a magnetic circuit is closed along the length of the sealing members.

4,702,039

AUTOMOBILE WEATHERSTRIPPING

Peter Bocchinfuso, St. Catharines, Canada, assignor to Gencorp Inc., Akron, Ohio

Filed Jan. 28, 1987, Ser. No. 7,543
Int. Cl.[4] E06B *7/16*
U.S. Cl. 49—490 **11 Claims**



1. A resilient weatherstrip between two parts, one of which is stationary and the other of which is movable in relation thereto, comprising:

(a) a hollow bulbous portion for compressively engaging the movable part as it moves towards the stationary part, the bulbous portion being mushroom shaped having cap and stem portions, the bulbous portion in cross-section including:

(I) a cap portion which has an outer surface which is smoothly curved outwardly away from the stem portion; and

(II) a stem portion which has a pair of spaced apart legs which curve inwardly towards each other from the cap portion in a direction away from the cap portion, the legs being thinnest adjacent to the cap portion and increasing in thickness as they extend from the cap portion which also increases in thickness from the legs to the peak of the cap portion and which is thicker than the legs adjacent the cap portion, so that the legs at their thinnest portion will bend more easily than the cap portion, one of the legs having at least one aperture therein for allowing the escapement of air from within the hollow bulbous portion; and

(b) means for fastening the bulbous portion to the stationary part.

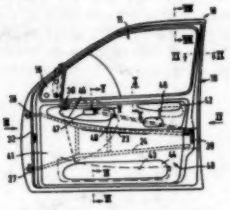
4,702,040

DOOR FOR A MOTOR VEHICLE

Edmund Hellriegel, Pulheim, Fed. Rep. of Germany, assignor to Dynamit Nobel AG, Troidorf, Fed. Rep. of Germany

Filed Jun. 12, 1986, Ser. No. 873,358
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3520975
Int. Cl.[4] B60J *5/04*
U.S. Cl. 49—502 **24 Claims**

1. A door for a motor vehicle comprising an outer skin means an inner skin means, said outer skin means and said inner skin means being fashioned as synthetic resin shells, said inner skin means being formed as an integral component of a body of the door which includes a supportive skeleton means comprising a plurality of rod-shaped strut means, said supportive skeleton means including a closed frame of a contour which corresponds to that of the door, and wherein said rod-shaped strut



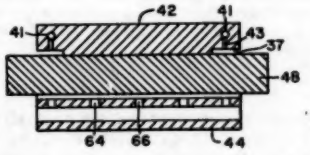
means is entirely coated by molding of the synthetic resin of said inner skin means.

4,702,041

PREVENTION OF FOREIGN MATERIAL INTRUSION IN AN AIR SLIDE FOR MACHINES

Meryle D. W. Alder, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Jul. 9, 1986, Ser. No. 883,743
Int. Cl.[4] B24B *41/02*
U.S. Cl. 51—165.71 **18 Claims**



1. In a machine for shaping a workpiece, said machine having a tool and a holder for said workpiece, an improved air slide for precisely determining the relative position between said tool and a predetermined reference comprising:

a center rail;

a carriage mounted for linear travel on said rail, one of said tool and said holder being mounted on said carriage, said carriage being formed by an upper plate, two side guides and a bottom plate;

means for supplying a thin film of air between said center rail and said carriage so that said carriage can be moved linearly on said rail for precise alignment between said tool and said reference;

recesses formed in opposite ends of said upper plate on the side adjoining said rail, air holes in said upper plate communicating with said recesses; and

means for selectively discontinuing a portion of said air supply necessary to move said carriage on said rail and for independently supplying air to said holes communicating with said recesses, and for flowing air outwardly from said recesses sufficient to prevent foreign material from entering said air slide.

4,702,042

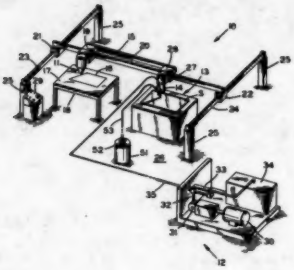
CUTTING STRENGTHENED GLASS

Richard A. Herrington, Walbridge; Thomas G. Kleman, Northwood, and Ermelinda A. Apolinar, Toledo, all of Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Continuation-in-part of Ser. No. 654,975, Sep. 27, 1984, Pat. No. 4,656,791. This application Apr. 15, 1985, Ser. No. 723,578
Int. Cl.[4] B24C *1/00*
U.S. Cl. 51—321 **13 Claims**

1. A method of cutting a sheet of heat strengthened glass

having its major surfaces in compression and its interior in tension, by means of an abrasive fluid jet, comprising supporting the sheet upon one of its major surfaces, directing a highly concentrated fluid jet into which abrasive particles have been introduced against the other major surface of said sheet at a first, lower cutting pressure on the order of 10,000 psi to initially penetrate the sheet without causing venting and chipping of the heat strengthened glass along the initial cut, substantially



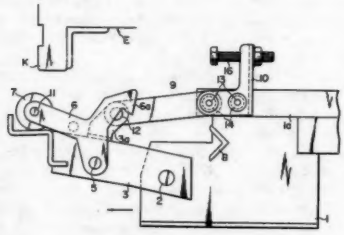
increasing the pressure of the fluid to a second, higher cutting level on the order of 30,000 psi after the initial penetration, moving the abrasive fluid jet relative to the sheet of glass along the desired line of cut with the cutting pressure at the higher level, and establishing the line speed of the fluid jet relative to the glass at the second cutting pressure so as to produce a smooth cut wherein the adjacent heat strengthened glass is free from vents and chips.

4,702,043

APPARATUS FOR TURNING UP AND DOWN SEATS FOR A TELESCOPIC SEATING SYSTEM

Fumihiko Suzuki, Tokyo, Japan, assignor to Kabushiki Kaisha Kotobuki, Tokyo, Japan

Filed Aug. 14, 1986, Ser. No. 896,409
Claims priority, application Japan, Feb. 28, 1986, 61-43358
Int. Cl.[4] E04H *3/12*
U.S. Cl. 52—9 **6 Claims**



1. In an apparatus for automatically turning up and down spectator's seats for a telescopic seating system of the type including a plurality of movable platforms which are arranged in tier, said movable platforms being displaced forwardly one after another in the jointed state when said telescopic seating system is in use and being displaced backwardly in the reverse manner when it is not in use, the improvement consisting in that;

a foot member is turnably supported within a base frame which is fixedly mounted on the movable platform, the bottom of each of said spectator's seats being fixedly placed on the top of said foot member,

a pair of Y-shaped lock links disposed on both the sides of the foot member in the parallel state are supported turnable about a support shaft which extends through the fore end of said lock links, the upper portions of the lock links rotatably carrying a locking and unlocking roller therebetween which serves as a weight and the lower portions of the same being formed with a hook respectively,

a locking angle is fixedly secured to the base frame at the position located behind the foot member in such a manner that said hooks are engaged to said locking angle to firmly hold the foot member in the upright standing posture when the locking and unlocking roller is lowered by turning movement, and

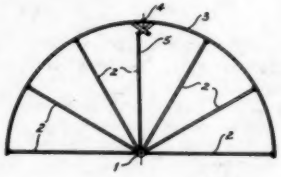
engagement of the hooks to the locking angle is released by abutment of the locking and unlocking roller against the front nose of the adjacent upper movable platform during backward movement of the first-mentioned movable platform.

4,702,044

MODIFIED ARCH SUPPORT

Peter R. Dominguez, 36 Trail Street, Wagga Wagga, New South Wales 2650, Australia

Filed Oct. 1, 1984, Ser. No. 656,591
Claims priority, application Australia, Oct. 5, 1983, PG1706
Int. Cl.[4] E04B *1/32*
U.S. Cl. 52—86 **4 Claims**



1. A device for supporting an arch during construction operations, comprising a hub member, a plurality of struts pivotally connected to the hub member and extending away from the hub member in one plane and in respective directions independently capable of adjustment relative to one another and relative to the hub member, an elongate load support band connected to the outer ends of the struts and adapted to support a load between the struts, said band being sufficiently flexible to permit alteration of the shape of the band upon adjustment of the struts, characterized by the provision of at least one lockable hinge in the load support band enabling the band to bend sharply through a predetermined angle in the said plane at the location of the hinge and to retain said predetermined angle by the locking of the hinge, wherein the lockable hinge comprises first and second hinge leaf members interconnected by a hinge pin allowing relative rotational movement along the axis of the pin between said hinge leaf members, an abutment extending from said first leaf member, and clamping means extending from said second leaf member adapted to engage and clamp said abutment to prevent relative rotation of said leaf members about said hinge pin.

4,702,045

ANCHOR FOR CONCRETING INTO HEAVY LOADS

Siegfried Fricker, Wurmberger Strasse, 30-34, 7135 Wiernsheim, Fed. Rep. of Germany

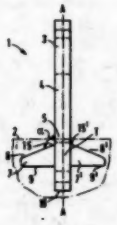
Filed Jul. 28, 1986, Ser. No. 889,836
Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3526940
Int. Cl.[4] E04G *21/14*
U.S. Cl. 52—125.4 **16 Claims**

1. An anchor consisting of solid material and adapted to be embedded in a heavy load, for example, a precast concrete member, for permitting lifting of such member, comprising:

(a) an anchor having a longitudinal axis and being comprised of a head formed with a recess which extends clear of said

precast member when said anchor is embedded and which is freely accessible for receiving lifting apparatus, and a solid anchor shank terminating at its lower end in a foot adapted to be embedded in such precast member, said shank being formed at a region spaced from its lower end with a transverse opening extending therethrough, and

(b) an insert formed separately from said anchor and extending through said opening, and means for positively securing said insert in said opening, said insert having expanding extensions projecting laterally from said shank, said extensions having flat saddle surfaces on the top thereof for better absorption of load forces applied to said anchor through said recess, said extensions being greater in size in at least one dimension than the size of said transverse opening.



4,702,046

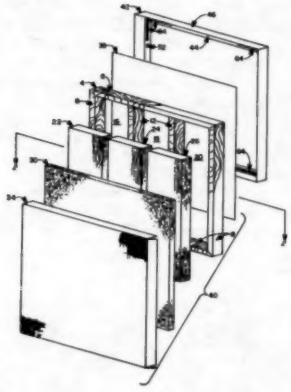
ACOUSTICAL WALL PANEL

Per Haugen; Harold M. Haugen, both of Sandy, and Ingolf J. C. De Jong, West Valley City, all of Utah, assignors to General Communications, Inc., Murray, Utah

Filed Nov. 8, 1985, Ser. No. 796,111

Int. Cl.[4] E04B *1/82*

U.S. Cl. 52—144 **13 Claims**



1. An acoustical wall panel for mounting on a wall or other surface comprising

a support frame,

sound absorbent batt material disposed within said frame, said material being selected to absorb acoustical energy within a certain frequency range,

a generally rigid acoustical board positioned in front and against the frame, with the peripheries of the frame and board being generally coincident, said board being selected to absorb acoustical energy within a frequency range different from said certain frequency range,

a generally acoustically transparent fabric positioned over the front surface of the board and extending over the edges of the board and support frame for the back of the frame where it is there attached, said fabric thereby holding the board and frame together, and

a mounting frame for mounting on a wall or similar surface and for receiving and holding the support frame, board and fabric.

4,702,047

GROUND ANCHORS

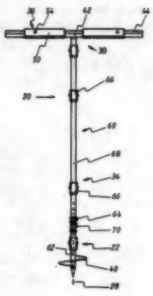
Bruce F. Stokes, Ruawai, New Zealand, assignor to Baramac Corporation Limited, Ruawai, New Zealand

Filed Sep. 26, 1986, Ser. No. 911,864

Claims priority, application New Zealand, Sep. 27, 1985, 213634

Int. Cl.[4] E02D *5/80*; B63B *21/24*

U.S. Cl. 52—156 **20 Claims**



1. A ground anchor comprising:

a first part insertable for engagement within an anchoring medium beneath the surface of the ground and having an insertion axis;

a second part;

load attachment means on said second part;

second ground engaging means on said second part operable in use for penetrating the surface of the ground upon load being applied to said anchor; and

linking means operatively connecting said first part and said second part, said linking means being operable to transfer load applied at said second part to said first part and allow displacement of said second part with respect to said insertion axis.

4,702,048

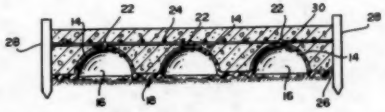
BUBBLE RELIEF FORM FOR CONCRETE

Paul Millman, 201 W. 70th St., New York, N.Y. 10023

Filed Apr. 6, 1984, Ser. No. 597,366

Int. Cl.[4] E04B *5/38*

U.S. Cl. 52—169.5 **6 Claims**



1. A modular bubble relief form adapted for incorporation within a concrete slab on grade comprising a substantially planar base member of light-weight, water impervious, thermoplastic material, said base member being conformably positionable on a subgrade for accommodatingly confining concrete in a plastic state for controlled curing, said base member further including a matrix of convex relief areas in an uppersurface of the base member defining a reinforcement support

plane said convex relief areas further controlling flow distribution of the concrete, seating means including integral tab elements within the reinforcement support plane for snugly receiving a concrete reinforcement member, an undersurface of said base member defining concave void spaces corresponding to the respective relief areas, said void spaces providing a reduction of the concrete volume and air insulation pockets for the concrete slab when the undersurface is in confronting relationship with the subgrade and a plurality of uniform spacer nodules projecting from the undersurface of the base member, said nodules providing displacement of the concrete slab from the subgrade for ground water drainage.

4,702,049

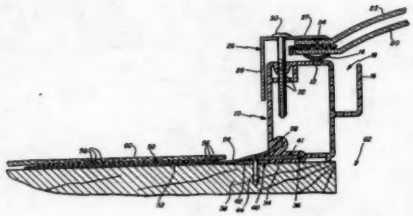
SKYLIGHT SEALING

Robert Sampson, Sanford, and Sean Flanigan, Wells, both of Me., assignors to Wasco Products, Inc., Sanford, Me.

Continuation-in-part of Ser. No. 839,419, Mar. 14, 1986, Pat. No. 4,703,539, which is a continuation-in-part of Ser. No. 749,947, Jun. 27, 1985, Pat. No. 4,589,238. This application Apr. 30, 1986, Ser. No. 857,940

Int. Cl.[4] E04B *7/18*

U.S. Cl. 52—200 **28 Claims**



1. In a skylight for covering an opening in a building having a rigid curb frame with means associated therewith for supporting a cover means, means for securing the curb frame to the building, and a flexible flashing flange extending from the base of the curb frame and disposed about the periphery of the curb frame, said flashing flange having a plurality of elongated spaced upstanding ribs that form flow diverters extending peripherally about the curb frame, said curb frame having a base slot for receiving said means for securing the curb frame, and sealing rib means within said base slot for sealing with said means for securing.

4,702,050

CASING WINDOW

Jean-Paul Giguere, Lotbiniére, Canada, assignor to Donat Flamand, Inc., Quebec, Canada

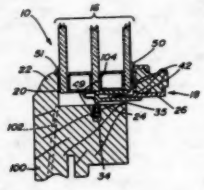
Continuation-in-part of Ser. No. 631,101, Jul. 16, 1984, Pat. No. 4,625,479. This application Jul. 14, 1986, Ser. No. 884,906

Claims priority, application Canada, Jun. 27, 1984, 457546

The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.

Int. Cl.[4] E06B *7/12, 3/58*

U.S. Cl. 52—202 **3 Claims**



1. A device for holding a multiple glazed sealed unit in a wooden sash having a rabbet, said glazed unit having a given uniform thickness, said sash defining an L-shaped seat receiving said glazed unit therein, said seat having a given uniform depth and being edged laterally by a shoulder portion which determines the depth of said seat and against which bears said glazed unit, the thickness of said glazed unit being no less than the depth of said seat, said device comprising:

a peripheral base member adapted to be inserted between said glazed unit and said sash, said peripheral base member being retained on said sash;

a removable peripheral retaining moulding, adapted to be engaged in the peripheral base member and pressing the glazed unit against the shoulder of the seat to hold said glazed unit in said sash, said peripheral retaining moulding being adapted to be engaged in said peripheral base member by means of a ratchet-stop allowing a progressive notch engagement of said peripheral retaining moulding in said peripheral base member but prevent unwanted withdrawal of said peripheral retaining moulding relative to said peripheral base member;

said peripheral base member being constituted by a jaw having two branches, one of which comprises on its inner side a set of teeth, said peripheral retaining moulding comprising a tongue substantially perpendicular to the plane of said sash, said tongue penetrating said base member and comprising, at one end, a pawl engaging the backside of said teeth in order to form said ratchet-stop;

said peripheral base member being retained on said sash by means of a longitudinal flange extending substantially at right angles relative to said base member, said flange penetrating and being held in a peripheral groove formed in said rabbet of said sash, said peripheral groove being spaced from said shoulder portion of said sash a predetermined distance;

said sash comprising a pair of uprights connected at their upper extremities by a sash head member and connected at their lower extremities by a sash sill member with said sash sill member having a wall spaced from said multiple glazed sealed unit to define an elongated chamber, said sash sill member comprising at least one drainage opening, said device further comprising a peripheral seal mounted to said peripheral base member and extending partially into said chamber with said seal being disposed to contact said multiple glazed sealed unit.

4,702,051

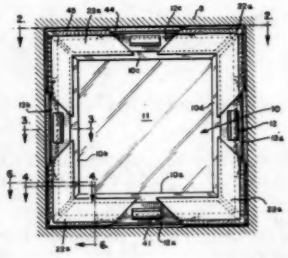
SIZE-ADJUSTABLE WINDOW INSERT ASSEMBLY

Clarence W. Miller, 111 Cedar La., Bourbonnais, Ill. 60914

Continuation-in-part of Ser. No. 605,616, Apr. 30, 1984, abandoned. This application Jul. 29, 1985, Ser. No. 760,274

Int. Cl.[4] E06B *3/26*

U.S. Cl. 52—202 **1 Claim**



1. A size-adjustable window insert assembly for use in combination with an existing window structure, the window structure including a window pane carried within a window frame,

to thereby form a thermally insulative double-paned window structure, wherein said window insert assembly comprises:

a first rectangular shaped frame with a rigid window pane carried therein, said first frame having an outboard facing side edge defining a first circumference;

a second rectangular shaped frame having an inboard open channel defined therein adapted to receive said first frame outboard facing side edge such that said first frame is surrounded by and carried within said channel with said first and second frames in substantially air-tight engagement, an outboard facing second frame side edge defining a second circumference, said second frame being formed of four elongated side sections, each said side section including a portion of said channel therein, each said section being independently movable inwardly and outwardly relative to said first frame, said first frame being captured within said second frame by flanges formed within each said side section channel that engage shoulders extending from said first frame;

resilient sealing material mounted on said second frame along said second circumference; and

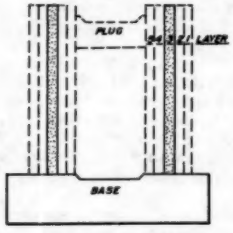
a leaf spring located in each channel portion of a respective second frame side section between said outboard facing side edge of said first frame and said second frame, said springs biasing each respective second frame side section away from said first frame, said second circumference being adjustable by pressing one or more side sections of said second frame against its spring bias to thereby reduce said second circumferential size to fit said window insert assembly within an opening defined by a window frame and spaced from an existing window pane therein, and then releasing said compression with said springs forcing said second frame to engage said window frame along said second circumference with a substantially air-tight seal.

4,702,052

PRESTRESSED CONCRETE PRESSURE VESSEL AND METHOD FOR MAKING SUCH A VESSEL

Philip Y. Chow, Orinda, Calif., assignor to T. Y. Lin International, San Francisco, Calif.

Filed Oct. 20, 1986, Ser. No. 921,942
Int. Cl.[4] E04C 3/293, 5/08
U.S. Cl. 52—224 **6 Claims**



4. A thick-walled high-pressure vessel, in which the stresses lie within allowable limits, including in combination

a series of generally concentric layers including at least one preconstructed intermediate layer initially resting on a base through a sliding joint, and, after application of an external prestressing pressure, is secured to the base by a rigid concrete connection,

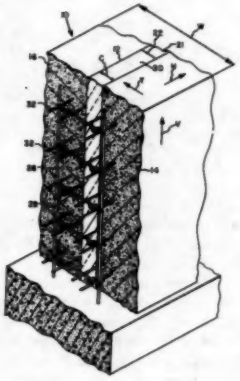
the remaining layers of said wall being thereafter constructed and stressed with an external prestressing pressure.

4,702,053

COMPOSITE INSULATED WALL

Donald B. Hibbard, Akron, Ohio, assignor to Hibbard Construction Co., Akron, Ohio

Filed Jun. 23, 1986, Ser. No. 877,537
Int. Cl.[4] E04C 2/22, 2/26
U.S. Cl. 52—309.7 **9 Claims**



1. A monolithic concrete insulated composite wall of predetermined vertical height, horizontal length and transverse width comprising:

(a) an insulation core having a predetermined thickness and extending the full horizontal length and vertical height of said wall and having a plurality of individual insulation panels;

(b) a continuous cast, outer concrete layer on a first side of said insulation core;

(c) a continuous cast, inner concrete layer on a second side of said insulatin core;

(d) a plurality of vertical ladders positioned transversely of said insulation core and extending between adjacent individual insulation panels and extending the predetermined vertical height of said wall, each vertical ladder having a pair of parallel vertical members and a plurality of cross members spaced vertically apart and rigidly connected on each end to the parallel vertical members, said vertical ladder having a width less than the predetermined transverse widt' of the wall and greater than the transverse width of said insulation core;

(e) a plurality of horizontal extending ladders lying in a plane perpendicular to said insulation core, said ladders being disposed in pairs on opposite sides of said insulation core and compressively positioned between said vertical members of said vertical ladder and said insulation core, each of said horizontal ladders having a vertical dimension less than the transverse dimension when positioned parallel to said cross member of said vertical ladder and having a multiplicity of openings along its horizontal length to allow communication and flow through said openings;

(f) a means for preventing vertical movement of said horizontal ladders relative to said cross member of said vertical ladder;

(g) said vertical ladder having a transverse dimension substantially equal to the thickness of the insulation core plus twice the transverse dimension of said horizontal ladders.

4,702,054
DOOR WITH RAISED PANELS

Terry A. Turner, Rte. 2, Box 424, Prineville, Oreg. 97754

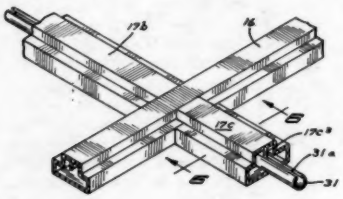
Continuation-in-part of Ser. No. 934,344, Nov. 24, 1986. This application Feb. 20, 1987, Ser. No. 16,928
Int. Cl.[4] E04C *1/00*; E06B *3/00*; B32P *3/10*; B32B *31/00*
U.S. Cl. 52—311 9 Claims

1. A raised panel door comprising:
- a core panel of rectangular configuration having width and length dimensions which are substantially the width and length dimensions of the door,
- rectangular lattice structure having width and length dimensions conforming substantially to those of the core panel, positioned in mating alignment with the core panel and joined to a face of the core panel, said lattice structure having horizontally and vertically extending expanses defining therebetween rectangular voids distributed over the structure,
- rectangular panel inserts positioned within said voids, each substantially filling a void, each panel insert having feathered margins extending along the perimeter thereof and a raised portion located inwardly from said margins,
- molding strips positioned over the feathered margins of a paneled insert and abutting the expanses defining the void receiving the panel insert, and
- a veneer overlay in covering relation over the outer face of the lattice structure and protruding in covering relation over the molding strips in regions where the strips abut said expanses.

4,702,055
GRILL STRUCTURE

James L. Ralph, 665 Grove Ave., Shoreview, Minn. 55112

Filed May 31, 1985, Ser. No. 739,887
Int. Cl.[4] E04B *1/48, 1/68*
U.S. Cl. 52—456 1 Claim

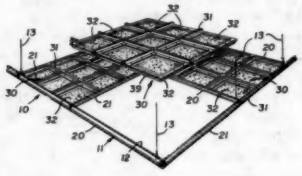


1. A grill structure for a door or window, having in combination
- a plurality of vertical members,
- a plurality of horizontal members,
- one of said plurality of members comprising segments having said other plurality of members therebetween,
- each of said segments having a channel longitudinally therethrough,
- each of said channels having a top wall,
- a rib depending from said top wall of each of said channels, said rib extending normal to a plane defined by said horizontal and vertical members,
- a rod having a longitudinal slot therein disposed in each of said channels receiving said rib therein thereby being retained against rotation,
- a perimeter member enclosing the ends of said vertical and horizontal members, and
- fastening means extending into the ends of said rod members through said perimeter member securing the same together.

4,702,056
SUBCEILING CONSTRUCTION

Bruce P. Carey, Saugus, Calif., assignor to Integrated Ceilings, Inc., Los Angeles, Calif.

Filed Sep. 25, 1986, Ser. No. 911,972
Int. Cl.[4] E04B *5/52*
U.S. Cl. 52—484 17 Claims



1. A subceiling construction comprising:
- a horizontally extending grid of spaced, longitudinal main runners and spaced, lateral cross runners transverse to said main runners forming a plurality of grid openings therebetween;
- means for suspending said grid from overhead building components; and
- a plurality of panel units disposed in said grid openings resting about their perimeters upon said main runners and cross runners, each of said panels units comprising
  - a unitary subgrid of at least one longitudinal rail and at lest one lateral rail intersecting thereacross forming a plurality of subgrid openings defined by adjacent segments of said longitudinal and lateral rails, and
  - a plurality of decorative light-transmitting subpanels, said subpanels disposed in said subgrid openings resting about at least portions of their perimeters upon said adjacent longitudinal and lateral rails.

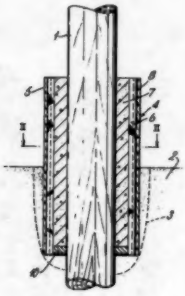
4,702,057
REPAIRING UTILITY POLES

Cecil L. Phillips, Boughton, Great Britain, assignor to Scott Bader Co., Ltd., Northamptonshire, Great Britain

Continuation-in-part of Ser. No. 787,092, Oct. 15, 1985, Pat. No. 4,644,722. This application Sep. 2, 1986, Ser. No. 902,749
Claims priority, application United Kingdom, Oct. 16, 1984, 8426085
The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.
Int. Cl.[4] E02D *5/60*; E04G *21/00*
U.S. Cl. 52—514 17 Claims

1. A method of repairing in situ a utility pole projecting from the ground comprising the steps of:
- fitting a sleeve of predetermined length around the pole at a predetermined clearance therefrom;
- filling the clearance only with a flowable hardenable composition selected from compositions with minimum-shrink and zero-shrink on hardening;
- allowing the composition to harden to a core which is bonded at least mechanically to the sleeve and to the pole

so as to be the sole means for transmitting sheer between the same;



thereby yielding an assembly comprising the pole, the core and sleeve wherein bending load is substantially solely sustained by the pole and the sleeve.

4,702,058

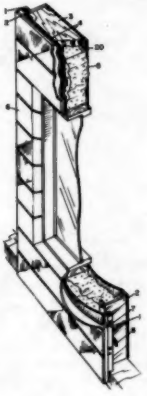
THERMAL STRUCTURAL WALL PANEL

Douglas E. Bennett, 1027 Mansfield Ct., Norcross, Ga. 30093

Filed Nov. 17, 1986, Ser. No. 931,561

Int. Cl.[4] E04C *1/00*

U.S. Cl. 52—584 **5 Claims**



1. A panel for use in building construction comprising in combination:

a core of ridged heat insulation, generally rectangular in shape with opposed major surfaces, opposed longitudinal edges and opposed ends;

a first and a second U-shaped chanel, each having a first and a second leg, attached over said opposed longitudinal edges whereby the first said leg engages one of said opposed major surfaces and the second said leg engages the other of said opposed major surfaces;

a first and second sheeting, the said first sheeting attached to one of said opposed major surfaces and said legs engaging the same and the said second sheeting attached to the other of said opposed major surfaces and said legs engaging the same;

a first and second flange permanently attached respectively to said first and second channel, each said flange having attaching means whereby the same may be attached to the opposite flange of another panel; facade adhesively bonded to the exposed surface said first sheeting throughout their contacting surfaces and extending beyond the said first sheeting longitudinal edges to the far edges of said flanges; and

a top and a bottom end cap placed on said opposed ends, between said channel legs and between said sheeting to form convenient attaching surfaces.

4,702,059

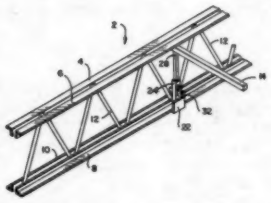
JOIST SYSTEM FOR FORMING CONCRETE SLABS

Neal Holtz, 1739 Church St., NW., Washington, D.C. 20036

Filed Jul. 18, 1986, Ser. No. 886,856

Int. Cl.[4] E04H *12/00*

U.S. Cl. 52—651 **9 Claims**



1. In combination with a bar joist of the type having an upper chord, a lower chord comprising at least one metal angle bar, said angle bar having a horizontal leg and a vertical leg, and an open web comprising metal bar stock secured to said top and bottom chords and triangulating the space therebetween, and adjustable support means secured to said angle bar of said lower chord for supporting a spanner bar, said adjustable support means comprising:

a base member;

means for securing said base member to said angle bar of said lower chord;

a first vertically extending member affixed to said base member, said first vertically extending member comprising a channel member having a rectangular cross-section and being

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4,702,060

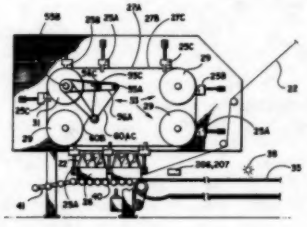
ADJUSTABLE PACKAGING DEVICE

Laurie M. Reid, Longwood, Fla., assignor to Uni-Pak Film Systems, Inc., Roswell, Ga.

Filed Jun. 26, 1986, Ser. No. 878,998

Int. Cl.[4] B65B *51/18*

U.S. Cl. 53—69 **22 Claims**



1. A machine for packaging articles in a container having a leading wall and a trailing wall, comprising:

means for guiding a plurality of said containers along a path of travel;

means for disposing a sheet over a plurality of said trays;

a first flight bar;

first transport means for moving said first flight bar in an

orbital path, said orbital path including a path segment extending along said path of travel of said containers;

a second flight bar;

second transport means for moving said second flight bar in said orbital path;

a third flight bar; and

third transport means for moving said third flight bar in said orbital path;

said first, second and third transport means operating independently of one another;

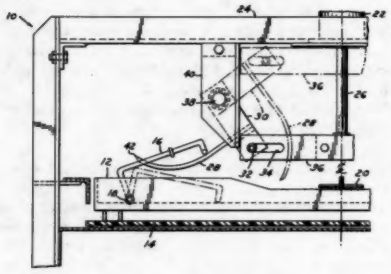
such that during said path segment said film sheet is pressed by one of said flight bars against the leading wall of said containers, by another of said flight bars against the trailing wall of said one container and against the leading wall of another of said containers, and against the trailing wall of said other container by the remaining flight bar.

4,702,061

AUTOMATIC BASKET BAIL OPENING MACHINE

Robert G. Richardson, Shoreview, Minn., assignor to Ex-Cell-O Corporation, Walled Lake, Mich.

Filed Mar. 17, 1986, Ser. No. 840,178
Int. Cl.[4] B65B *43/26*
U.S. Cl. 53—381 R **3 Claims**



1. A machine for opening bails pivotally mounted on the sides of a basket or tray and collapsed inwardly and downwardly against the bottom of the basket or tray, said machine comprising a conveyor for continuously moving the basket or tray, a pair of cylinder-actuated, pivotally mounted arcuate-shaped lift arms for partially lifting the collapsed bails from the bottom of the basket or tray, a pair of longitudinally mounted, sloped, fixed plow bars for further partial opening of the bails, and a pair of horizontally mounted, cylinder-actuated fixtures for completing the opening of the bails into a vertical position.

4,702,062

WINDROW SHAPING APPARATUS

Gerald E. Phelan, Rte. 4, Box 4960, Jerome, Id. 83338

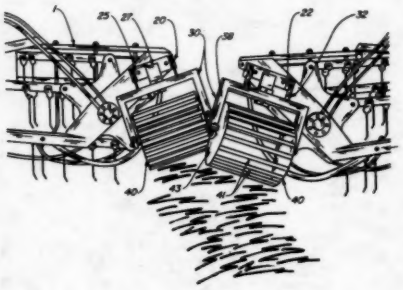
Filed Mar. 10, 1986, Ser. No. 837,942
Int. Cl.[4] A01D *43/00*
U.S. Cl. 56—192 **5 Claims**

1. Windrow shaping apparatus, for forage, attachable to the rear of an existing rake, said windrow shaping apparatus comprising:

at least one yoke attachment member securely engaging said rake;

at least one yoke, said yoke pivotally engaging said attachment member, said yoke carried at a selected height above ground level; and

at least one drum, said drum rotatably engaging said yoke and said yoke and said drum being set at an inclined angle relative to the rake and to a windrow, that portion of the drum engaging the edge of a windrow being lower than that portion of the drum engaging the center of the windrow to cause unrestrained compaction by the drum on the forage toward the center of the windrow.

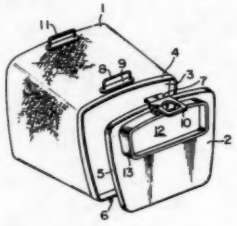


4,702,063

GRASS COLLECTING BAG FOR LAWN MOWER

Masatoshi Satoh, Tokyo, and Junichi Akaike, Chofu, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Jan. 28, 1986, Ser. No. 823,247
Claims priority, application Japan, Feb. 1, 1985, 60-13273[U]
Int. Cl.[4] A01D *34/70*
U.S. Cl. 56—202 **2 Claims**



1. A grass collecting bag for a lawn mower comprising:

a bag member having an opening at one end and a brim around the opening;

a cover member attached to said bag member so as to cover said opening of said bag member, said cover member having a flange portion and being completely separable from said bag member to facilitate removal of grasses from the bag; and

a retaining means pivotally secured to said cover member and adapted to retain said cover member on said bag member;

wherein said brim of said opening of said bag member is reinforced by a reinforcing member such that said opening maintains a predetermined shape, the reinforced opened end of said bag member being adapted to fit in said flange portion of said cover member,

said retaining means has a lever to control retaining of said cover member to said bag member for portable removal of a unit from said lawn mower, said lever being usable as a handle by lifting said lever for carrying said bag member and said cover member when connected by said retaining means and disconnected from said lawn mower, and

said retaining means is located with respect to said bag member and cover member so that when said lever is lifted to be used as said handle, said retaining of said cover member to said bag member is provided, and so that said retaining can be ended by pushing said lever down, after

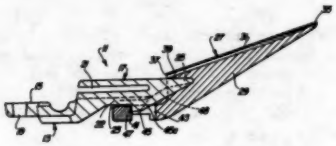
setting down said bag member with said cover member retained thereto.

4,702,064

CROP FINGERS FOR HARVESTERS

Victor L. Hunter, Willetton, and Alan D. Fisher, Graylands, both of Australia, assignors to Clarewood Pty. Ltd., Redcliffe, Australia

Filed Oct. 9, 1985, Ser. No. 786,748
Claims priority, application Australia, Oct. 9, 1984, PG7559
Int. Cl.[4] A01D *34/18*
U.S. Cl. 56—312 **5 Claims**



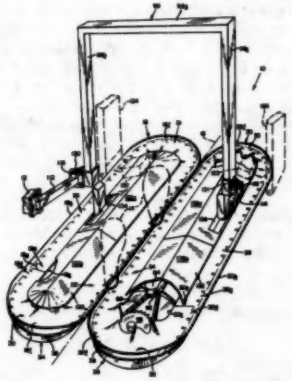
1. A crop finger extension detachable mountable on a crop finger body having an underside and an outer end, the crop finger extension comprising: a one piece body portion having an upper surface with a forward end and a rearward end, a recess in the body portion adjacent the rearward end of the upper surface to snugly receive and envelop the outer end of the crop finger body, and an integral rearward extension extending rearwardly of said recess on the underside thereof; said rearward extension being adapted to locate against the underside of the finger body and being provided with first means engagable with corresponding second means on said crop finger body underside to lock said finger extension in position on the finger body wherein upstanding engaging means are provided along the longitudinal sides of the rearward extension, the engaging means being adapted to engage against the longitudinal sides of the finger body.

4,702,065

BELTED CROP-COLLECTING AND CONVEYOR SYSTEM

Eugene G. Littau, c/o Littau Harvester, 8974 Shaw Square Rd., SE., Aumsville, Oreg. 97325

Filed Apr. 25, 1986, Ser. No. 856,057
Int. Cl.[4] A01D *46/22*
U.S. Cl. 56—329 **22 Claims**



1. A collector apparatus for use on a harvester vehicle for collecting a crop harvested from plants arranged in rows comprising:

a pair of elongate continuous conveyor belts formed of pliable and resilient material, each conveyor belt having an elongate inner run, said inner runs being disposed adjacent and opposite each other, and each conveyor belt having an elongate outer run, said outer runs being disposed laterally outwardly of the inner runs, the conveyor belts having faces delineated between the lateral margins of the belts that face upwardly;

an elongate conveyor frame associated with each belt for supporting the conveyor belt, training means mounted on each conveyor frame training thereabout the conveyor belt associated with the conveyor frame, each conveyor frame further including an elongate conveyor belt run support extending under the inner run of the conveyor belt associated with the conveyor frame and supporting the inner run above the ground;

means for driving said conveyor belts in counter rotating paths; and

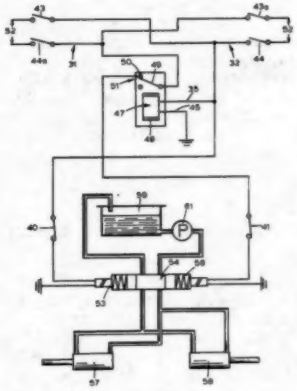
attachment means for attaching said conveyor frames to the vehicle.

4,702,066

ROUND BALER WITH AUTOMATIC STEERING SYSTEM

Vincent W. Newendorp, and Daryl W. Van Zee, both of Pella, Iowa, assignors to Vermeer Manufacturing Company, Pella, Iowa

Filed Jul. 25, 1986, Ser. No. 889,235
Int. Cl.[4] A01D *39/00*
U.S. Cl. 56—341 **5 Claims**



1. A round crop baler machine, including:

(a) a main frame,

(b) an expandable bale-forming chamber on said main frame extending transversely of the baler,

(c) means for feeding a crop windrow into said chamber,

(d) a plurality of endless belts for defining said chamber movable in longitudinally and vertically extended paths in parallel planes spaced transversely of the baler, with a belt adjacent each end of said chamber,

(e) tension means providing for an initial belt tension in the starting of a bale and for a progressively increasing belt tension during the growth of a bale in said forming chamber,

(f) a belt sensing means for each of said end belts for sensing the tension changes in said end belts, said sensing means being alternately actuated by tension variations in said end belts during the expansion of said chamber by a blae being formed,

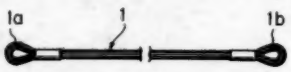
(g) a pair of steerable wheels for supporting said frame,
(h) a power unit for each of said steering wheels,
(i) means connecting said wheels for concurrent steering movement in response to a concurrent operation of said power units,
(j) means for controlling the concurrent operation of said power units in response to an actuation of either one of said sensing devices to alternately steer said baler in opposite directions laterally of the crop windrow, whereby to form a bale in said chamber of a substantially uniform diameter,
(k) each of said power units is a double acting hydraulic cylinder assembly, and
(l) a hydraulic circuit having means for supplying fluid under pressure to said power units, and a solenoid actuated hydraulic valve unit for concurrently controlling the supply of fluid under pressure to said power units, and an electrical circuit for said belt sensing means and valve unit for operating said power units in response to the alternate actuation of said sensing means,
(m) each of said sensing means including a pair of limit switches in said electrical circuit and a movably mounted actuating arm movable, in response to the tension variations in an end belt during the bale forming expansion of said chamber, into contact with one or the other of said limit switches to operate said power units, and
(n) said actuating arm movable into and out of contact engagement with one of said limit switches during the initial forming of a bale in said chamber, and into and out of contact engagement with the other one of said limit switches in the final forming of a bale in said chamber.

4,702,067

ARCHERY STRING

Tadao Izuta, Shizuoka, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Mar. 14, 1986, Ser. No. 839,416
Claims priority, application Japan, Apr. 23, 1985, 60-060924[U]; Apr. 23, 1985, 60-060925[U]
Int. Cl.[4] D02G *3/00*
U.S. Cl. 57—243 **9 Claims**



1. An improved archery string comprising a plurality of strands bundled together, each said strand being made up of a plurality of elementary yarns of a prescribed thickness twisted together, each said elementary yarn being made up of plurality of polyethylene monofilaments bundled together, each said monofilament having a thickness in a range of 5 to 20 denier, a Young's modulus in a range from 1.16×10 to 2.18×10 pounds per square inch, and a specific gravity in a range from 0.96 to 0.98.

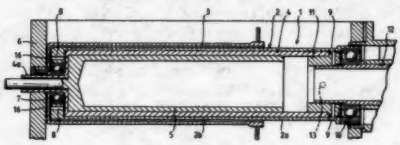
4,702,068

FRICTION SPINNING ROLLER

John Whiteley, Clitheroe, England, and Fred A. Shepherd, Kilearn, Scotland, assignors to Hollingsworth U.K., Ltd., Accrington, England

Filed Sep. 25, 1986, Ser. No. 912,031
Int. Cl.[4] D01H *7/882*
U.S. Cl. 57—401 **14 Claims**

1. A friction spinning roller comprising
(a) perforation means defining a perforated cylindrical surface;
(b) suction appling means within said perforation means;
(c) air transmitting bearing means rotatably supporting said peroforation means and defining a first air leakage path from the exterior of said perforation means to said suction applying means; and
(d) means defining at least one vent communicating the interior of said perforation means with the exterior thereof adjacent said air-transmitting bearing means, and for providing a second air leakage path which is deliberately of lower resistance than said first air leakage path through the air-transmitting bearing means, said air-transmitting bearing means being outside said second air leakage path whereby said first and second air leakage paths are in parallel with one another.

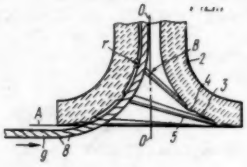


4,702,069

OPEN-END SPINNING DEVICE

Gennady K. Maximov; Arkady F. Brusnikin; Vladimir I. Belonosov; Roza A. Popova; Vladimir S. Fux; Vladimir M. Kagan; Silvia L. Uralskaya, and Nadezhda P. Orlova, all of Moscow, U.S.S.R., assignors to Vsesojuzny Nauchnoissledovatelsky Institut Legkogo I Tekstilnogo Mashinostroenia, Moscow, U.S.S.R.

Filed Mar. 11, 1987, Ser. No. 24,718
Int. Cl.[4] D01H *7/885, 1/135*
U.S. Cl. 57—417 **3 Claims**



1. An open-end spinning device, comprising: a driven spinning chamber; an outlet tube mounted coaxially with said spinning chamber and having a curvilinear inner surface of a varying cross-section; a projection provided on the inner curvilinear surface of said outlet tube along a spiral uncoiling in the direction towards said spinning chamber; the configuration of the spiral of said projection being chosen in such a manner that the projection of an angle formed between a tangent line to the spiral and a line drawn at right angles to the longitudinal axis of the tube on an imaginary plane drawn at right angles to the longitudinal axis of the tube in the zone of a portion of the spiral most distant from said spinning chamber being between 30° and 40°, the angle gradually increasing as the spiral uncoils.

4,702,070

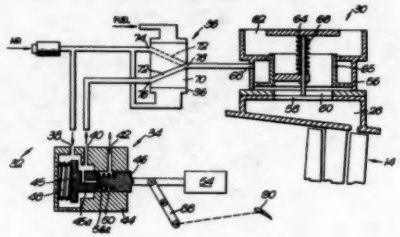
GAS TURBINE ENGINE VALVE CONTROL SYSTEM

John E. Cureton, Coventry, and Michael R. Lyons, Leicester, both of England, assignors to Rolls-Royce plc, London, England

Filed Jan. 29, 1986, Ser. No. 823,756
Claims priority, application United Kingdom, Mar. 5, 1985, 8505605
Int. Cl.[4] F02C *7/00*
U.S. Cl. 60—39.07 **5 Claims**

1. A gas turbine engine compressor having a bleed valve and bleed valve control means, the bleed valve control means having a control valve and a diverter valve, the control valve

having an operating means and, said bleed valve control means including means for receiving a flow of pressurised air from the compressor, an outlet for the pressurised air connected to the bleed valve via the diverter valve, and an outlet for the pressurised air vented to atmosphere, the diverter valve having an operating means, an inlet for a flow of pressurised air from the compressor, an inlet for a flow of pressurised air from the



control valve and an outlet for the pressurised air connected to the bleed valve, the operating means of the control valve being operable to either connect the air inlet to the bleed valve air outlet or to the vent, the operating means of the diverter valve being operable to close the inlet receiving pressurised air from the control valve and to connect the diverter valve inlet receiving pressurised air from the compressor with the outlet connected to the bleed valve.

4,702,071

INLET PARTICLE SEPARATOR

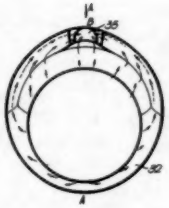
John E. Jenkins, Hemel Hempstead; John Sperinck, Watford, and Michael J. Buller, Kings Langley, all of England, assignors to Rolls-Royce plc, London, England

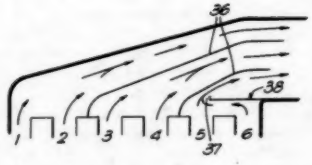
Filed Jun. 19, 1986, Ser. No. 875,992

Claims priority, application United Kingdom, Jun. 28, 1985, 8516363

Int. Cl.[4] F02G *3/00*

U.S. Cl. 60—39.092 **8 Claims**





1. An inlet particle separator comprising:

a circumferentially extending scavenge chamber defined by one or more wall members and positioned radially outward of a duct, said scavenge chamber having an annular intake portion for receiving a flow of gas and particles from the duct;

exhaust vent means for venting a flow of gas and particles from the scavenge chamber; and

at least one flow divider positioned radially between the intake portion and the exhaust vent means, extending axially from one of said one or more wall members, and extending circumferentially at least part way round the scavenge chamber, said at least one flow divider being axially and circumferentially dimensioned and arranged in relation to said one wall member to define a plurality of flow paths of substantially even flow resistance which extend between the intake portion and the exhaust vent means.

4,702,072

INTERNAL COMBUSTION ENGINE

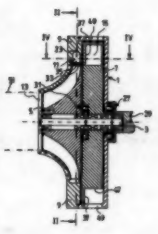
Gerhard Kielhorn, Sommerhalde 33, D-7900 Ulm-Ermingen, Fed. Rep. of Germany

Filed Aug. 20, 1985, Ser. No. 767,712

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1984, 3430613

Int. Cl.[4] F02C *5/12*

U.S. Cl. 60—39.39 **8 Claims**



1. Internal combustion engine comprising

(a) a stator (1) with a central axis and having at least one combustion chamber spaced outwardly from and extending generally circumferentially of the central axis, said combustion chamber having a first end and a closed second end (42), said combustion chamber has an inlet opening and an outlet opening located adjacent the first end thereof so that said combustion chamber has a predetermined outflow direction (43) extending in the direction from the second end toward the first end,

(b) a rotor (7) rotatably supported adjacent said stator for rotation about the central axis and having at lest one expansion chamber movable past the outlet opening (19) of said combustion chamber (11), said expansion chamber having a first working surface (25) therein for redirecting the combustion gases flowing from the outlet (19) into a direction essentially opposite to the outflow direction (43),

(c) a compressor (5) arranged to charge the combustion chamber with compressed combustion gas through the inlet opening (35) in the direction toward the closed second end (42), said compressor comprising a vane wheel (5) rotatable about the central axis in the rotational direction (39) opposite to the direction of rotation (45) of said rotor (7), said compressor accelerates the compressed combustion gases in the circumferential direction relative to the central axis and introduces the compressed combustion gas in the tangential direction of flow through the inlet opening (35) into said combustion chamber (11),

(d) a valve means (33, 37) for connecting alternately said inlet opening (35) of said combustion chamber (11) with said compressor (5) and the outlet opening (19) of the combustion chamber (11) with said expansion chamber (25),

(e) ignition means (23) for igniting the combustion gases intermittently charged into said combustion chamber (11), and

(f) said expansion chamber (15) extends in the circumferential direction about the central axis and has an inlet opening adjacent said working surface (25) and an outlet opening spaced in the circumferential direction relative to the central axis from the working surface (25), and said expansion chamber (15) is shaped so that the combustion gases entering the expansion chamber (15) from the combustion chamber (11) through said valve means (33, 37) are expanded essentially in a single expansion stage down to the pressure of the ambient atmosphere.

4,702,073

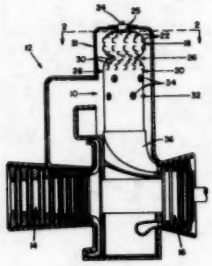
VARIABLE RESIDENCE TIME VORTEX COMBUSTOR

Jerry O. Melconian, 76 Beaver Rd., Reading, Mass. 01867

Filed Mar. 10, 1986, Ser. No. 838,165

Int. Cl.[4] F02C *3/14*

U.S. Cl. 60—39.464 **19 Claims**



1. A variable residence time vortex combustor comprising:

a primary combustion chamber for containing a combustion vortex;

a plurality of louvres peripherally disposed about said primary combustion chamber and longitudinally distributed along its primary axis, said louvres inclined to impel air about said primary combustion chamber to cool its interior surfaces and to impel air inwardly to assist in driving the combustion vortex in a first rotational direction and to feed combustion in said primary combustion chamber;

a second combustion chamber including a secondary zone; and

said primary combustion chamber further including a narrowed waist region, interconnecting the output of said primary combustion chamber with said secondary zone for passing only lower density particles and trapping higher density particles in the combustion vortex in said primary combustion chamber for substantial combustion.

4,702,074

INTERNAL COMBUSTION ENGINE SYSTEM WITH FOG INJECTION AND HEAT EXCHANGE

Michael Munk, 28 Dorchester Dr., Rye Brook, N.Y. 10573

Filed Jul. 30, 1985, Ser. No. 760,357

Int. Cl.[4] F02C *7/10, 7/00*

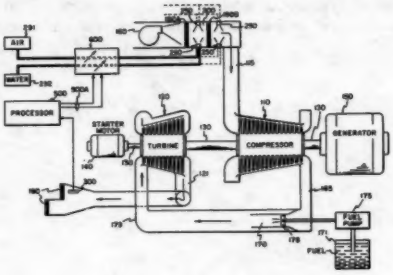
U.S. Cl. 60—39.511 **7 Claims**

1. An improved turbine apparatus, comprising:

a turbine power generator, including a source of input air, and a source of fuel, a compressor which receives said input air, a combustion chamber which receives air from the output of the compressor and fuel from said source of fuel, a turbine which receives exhaust gases from said combustion chamber; and an electrical generator mechanically coupled with said turbine;

a fogging device communicating with said input air, said fogging device being adapted to receive a fogger air supply and a fogger water supply, and to generate a fog in said input air;

an adjustable heat exchanger for exchanging heat from the exhaust of the turbine to the input air to be fogged; and



means for adjusting the level of heat exchange of said heat exchanger in accordance with properties of the input air and the level of fog being generated.

4,702,075

PROCESS AND DEVICE FOR OPERATING A DIESEL ENGINE WITH AN EXHAUST-GAS PARTICLE FILTER

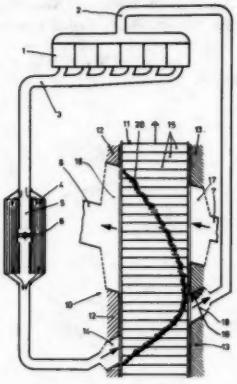
Ernst Jenny, Baden, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Oct. 30, 1985, Ser. No. 792,822

Claims priority, application Switzerland, Nov. 9, 1984, 5387/84

Int. Cl.[4] F01N *3/02;* F02B *33/00*

U.S. Cl. 60—274 **4 Claims**



1. A method of operating a diesel engine of the type having an exhaust-gas passage connected to a gas-dynamic pressure-wave machine, a particle filter at a location along said exhaust-gas passage and a bypass passage bypassing said particle filter, said method comprising the steps of:

starting the engine with the bypass passage closed so that substantially all exhaust gases are conveyed through the particle filter;

operating the engine in the range of idle and up to a predetermined partial load with the bypass passage opened so that substantially all exhaust gases are conveyed through the bypass passage and delivered to the pressure wave machine in an unfiltered condition;

operating the engine beyond the predetermined partial load with the bypass closed constantly and completely so that substantially all exhaust gases are delivered to the pressure wave machine in a filtered condition; and

elevating the temperature of exhaust gases passing through the exhaust-gas passage during said operating steps by recirculating a portion of the exhaust gases through the engine by means of the pressure wave machine.

4,702,076

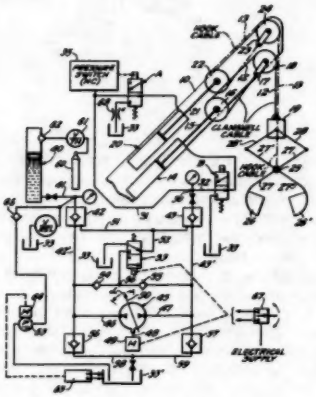
HYDRAULICALLY OPERATED CLAM-SHELL DEVICE

Alan H. Rosman, Madrid, Spain, assignor to Dynamic Hydraulic Systems, Inc., Canoga Park, Calif.

Continuation-in-part of Ser. No. 601,481, Apr. 18, 1984, which is a continuation-in-part of Ser. No. 570,590, Jan. 13, 1984. This application Jul. 23, 1984, Ser. No. 633,397

Int. Cl.[4] F16H *39/46*

U.S. Cl. 60—372 17 Claims



1. In a cable-suspended hydraulically operated lift system wherein a clamshell or the like device having separate hook-cable and clamshell-cable suspension connections is to be lifted and/or actuated by separate cables respectively coupled to said hook-cable and clamshell-cable connections, the improvement wherein first and second traction cylinders are mounted in parallel for independent traction-actuation of the respective cables, pressurized hydraulic-accumulator means connected as a closed system which includes separate connections to said traction cylinders, said closed system including reversibly controllable rotary power-integrator means between said accumulator means and the respective separate connections to said traction cylinders, valve means in the separate connection to the traction cylinder associated with the hook-cable connection, said valve means having a first position providing an open-flow connection between said accumulator means and said hook-cable traction cylinder and a second position blocking flow therebetween, and means including a pressure-responsive threshold device connected for response to pressure in the connection to said clamshell-cable traction cylinder, said last-mentioned means being so associated with said valve means as to determine a shift from the second to the first positions thereof upon achievement of a predetermined sensed threshold pressure so that flow from said power-integrator means causes both cylinders to share the lifting load.

4,702,077

MASTER CYLINDER FOR VEHICLE BRAKING SYSTEM

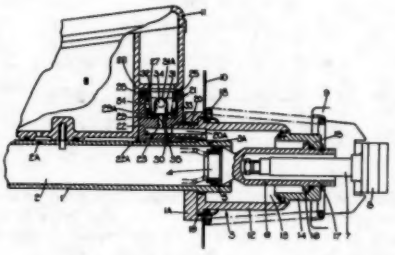
Eric M. Lilley, and David J. Parker, both of Solihull, England, assignors to Lucas Industries, Birmingham, England

Continuation of Ser. No. 575,564, Jan. 31, 1984, abandoned. This application Jun. 24, 1986, Ser. No. 879,496

Claims priority, application United Kingdom, Feb. 15, 1983, 8304108

Int. Cl.[4] B60T *11/08*

U.S. Cl. 60—578 18 Claims



1. A master cylinder of the quick-fill type comprising:

an elongated tubular pressure cylinder having a relatively thin uniform wall thickness along substantially its entire length and an open end;

a main piston operatively slidably mounted within said pressure cylinder;

a separate closure member having an inner end mounted on said open end of said tubular pressure cylinder partially enclosing said open end, said closure member extending axially outwardly from said open end of said pressure cylinder and having an outer end;

a cylindrical bore in said closure member communicating adjacent one end with said open end of said tubular pressure cylinder and at least partially defining a quick-fill chamber;

a quick-fill piston operatively slidably mounted within said cylindrical bore defining said quick-fill chamber and extending in the non-actuated rest position axially outwardly beyond said outer end of said closure member;

a separately made independent fluid reservoir member mounted on the outer wall of said tubular pressure cylinder;

means for connecting said pressure cylinder with the interior of said reservoir member to facilitate flow of fluid therebetween;

fluid flow channel means connecting said quick-fill chamber to the interior of said reservoir member; and

valve means operatively mounted in said channel means for controlling the flow of fluid between said quick-fill chamber and said reservoir.

4,702,078

MASTER CYLINDER

Stuart J. Briggs; David J. Parker, both of Staffordshire, England, and Peter Schlüter, Koblenz, Fed. Rep. of Germany, assignors to Lucas Industries Public Limited, Co., Birmingham, England

Continuation of Ser. No. 593,570, Mar. 26, 1984, abandoned. This application Aug. 6, 1986, Ser. No. 894,505

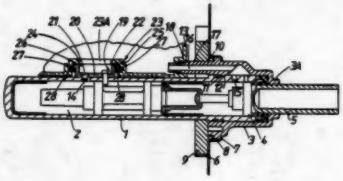
Claims priority, application United Kingdom, Mar. 31, 1983, 8309054

Int. Cl.[4] B60T *11/26*

U.S. Cl. 60—585 5 Claims

1. A master cylinder assembly comprising: a pressure cylinder; a reservoir mounted thereon; a first mounting formation on the cylinder; a second formation on the reservoir; a recess in one of said mounting formations for receiving, in interen-

gagement with, the other formation; a pair of oppositely disposed grooves in said recess, each groove having a planar retaining surface thereon; a pair of oppositely disposed lateral flanges on the other mounting formation having peripheral dimensions slightly less than the dimensions of said recess so that said flanges are insertable into said recess by relative substantially perpendicular movement of said flanges and recess, and said flanges respectively lie adjacent said grooves



when said formations are interengaged, each flange having a planar retaining surface thereon lying in a plane facing the plane of said retaining surface on a respective one of said grooves; and a separate locking member having a pair of spaced parallel legs which engage in said grooves of said first mounting formation in such a manner that each leg bridges between a retaining surface of the groove within which it lies and a respective retaining surface of the adjacent flange for retaining said reservoir on said cylinder.

4,702,079

AIR-COOLED TYPE INTERCOOLER FOR A SUPERCHARGED INTERNAL COMBUSTION ENGINE

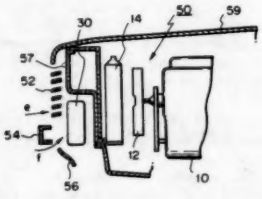
Taiji Saito, Okazaki, and Akira Kotani, Toyota, both of Japan, assignors to Toyota Kidosha Kabushiki Kaisha, Japan

Filed Oct. 1, 1985, Ser. No. 782,447

Claims priority, application Japan, Oct. 11, 1984, 59-211518

Int. Cl.[4] F02B *29/04*

U.S. Cl. 60—599 **2 Claims**



1. A vehicle comprising an engine room having a radiator grille at a front end thereof, an engine room hood lock support at a position behind said radiator grille, a bumper located below said radiator grille, and an air dam skirt located below said bumper; a tranversely extending chamber-like space formed between said radiator grille, said hood lock support, said bumper and said air dam skirt; an engine body provided within said engine room; a supercharging system in fluid communication with said engine body, said supercharging system comprising a pair of turbochargers arranged in parallel; and an intercooler provided in said chamber-like space, said intercooler comprising an inlet tank in fluid communication with said supercharger system for receiving compressed air therefrom, an outlet tank in fluid communication with said engine body for introducing cool air into said engine body, and a radiator core arranged between said inlet tank and said outlet tank, said radiator core comprising a plurality of horizontally juxtaposed and vertically extending heat exchanger pipes between which air can pass in order to cool compressed air in said heat exchanger pipes, said radiator core having a length in the horizontal direction which is greater than a height of said radiator core in the vertical direction; wherein air passing over said air dam skirt, below said bumper, is directed onto said vertically extending heat exchanger pipes of said intercooler.

4,702,080

METHOD AND APPARATUS OF CONTROLLING SUPERCHARGING PRESSURE IN A TURBOCHARGER

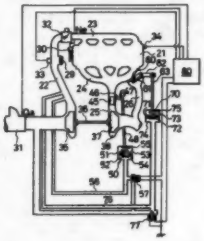
Takashi Ueno, Yokosuka; Toshimi Abo, Yokohama, and Katsunori Miyamura, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan

Division of Ser. No. 807,225, Dec. 10, 1985. This application Oct. 29, 1986, Ser. No. 924,451

Claims priority, application Japan, Dec. 11, 1984, 59-261417; Dec. 11, 1984, 59-261416; Dec. 11, 1984, 59-261418

Int. Cl.[4] F02B *37/12*

U.S. Cl. 60—602 **2 Claims**



1. An apparatus for controlling supercharging pressure in a turbocharger comprising an exhaust turbine and a compressor, said apparatus comprising a variable geometry means at an inlet to said exhaust turbine, an exhaust bypass valve means bypassing said exhaust turbine, an operation detecting means which detects operating conditions of a device connected to receive a supercharging pressure, a supercharging pressure detecting means which detects the supercharging pressure, a deviation calculating means which calculates the deviation of the detected supercharging pressure from a target supercharging pressure to provide a control value based on said deviation, first and second control calculating means which calculate the controlled variable of said variable geometry means and said exhaust bypass valve means in accordance with parameters representative of the operating conditions including said control value, an operating range discriminating means which discriminates in which operating range feedback control is performed and selects whether to perform control in either said variable geometry means or said exhaust bypass valve means in accordance with the result of the operating range discrimination and said control value, and an overboost control means which raises said target supercharging pressure during a predetermined time when sudden acceleration is detected, wherein when said overboost control means is operated for overboost control, the operating range for performing feedback control by said variable geometry means is increased.

2. A method of controlling supercharging pressure in a turbocharger comprising a combination of an exhaust turbine and a compressor, a variable geometry means at an inlet to said exhaust tubine, an exhaust bypass valve means bypassing said exhaust turbine, an operation detecting means which detects operating conditions of a device connected to receive a supercharging pressure, a supercharging pressure detecting means which detects the supercharging pressure, a deviation calculation means which calculates the deviation of said detected supercharging pressure from a target supercharging pressure to provide a control value on the basis of said deviation, first and second control calculating means which calculate the controlled variable of said variable geometry means and said exhaust bypass valve means in accordance with parameters representative of the operating conditions including said con-

trol value, and an operating range discriminating means which discriminates in which operating range feedback control is performed and selects whether to perform control in either said variable geometry means or said exhaust bypass valve means in accordance with the result of the operating range discrimination and said control value, said method comprising the steps of providing an overboost control and an overboost control means by raising said target supercharging pressure during a predetermined time when sudden acceleration is discriminated, and increasing the operating range for performing feedback control in said variable geometry means when said overboost control is performed.

4,702,081

COMBINED STEAM AND GAS TURBINE PLANT

Mucic Vinko, Walldorf, Fed. Rep. of Germany, assignor to TCH Thermo-Consulting-Heidelberg GmbH, Heidelberg, Fed. Rep. of Germany

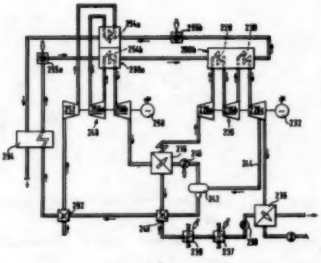
PCT No. PCT/EP86/00/07, § 371 Date Nov. 14, 1986, § 102(e) Date Nov. 14, 1986, PCT Pub. No. WO86/05234, PCT Pub. Date Sep. 12, 1986

PCT Filed Mar. 3, 1986, Ser. No. 930,261

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509357

Int. Cl.⁴ F01K *23/02*

U.S. Cl. 60—655 **3 Claims**



1. Combined steam and gas turbine plant for the production of electrical energy, having a steam generator which is followed in a circuit by a steam turbine driving an electrical generator, from which the steam, after liquefaction in a condenser, is returned to the steam generator as feed water by means of a condensate pump through at least one preheating stage, and having a gas turbine driving a second electrical generator, which is driven by a turbine gas, preferably nitrogen or helium running in the closed circuit, and whose outlet for the heated turbine gases is connected by a conduit to heating surfaces in the steam generator and to the heat exchanger forming the preheating stage following the heating surfaces, which is inserted into the branch of the circuit that returns the condensate to the steam generator, the steam generator in combination with the gas turbine being so constructed that the evaporation of the feed water takes place at supercritical pressure, and the steam turbine is divided into at least two turbine parts and an intermediate superheating stage is inserted between each pair of successive turbine parts, characterized in that the gas turbine (**248**) is constructed as a multi-part turbine (**256***a;* **256***b*) with multiple expansion and intermediate heating of the turbine gases, that the heaters (**254***a;* **254***b*) for the turbine gases are formed, like the intermediate superheaters (**230**; **228**) in the steam circuit, by heating surfaces of a coal-fired boiler (**290**), and that the coal-fired boiler (**290***a;* **290***b*) has two separate fire chambers (**255***a;* **255***b*) in tandem having separate hearing surfaces associated one with the heaters (**254***a*) and one with the intermediate heaters (**254***b*) of the gas turbine (**248**).

4,702,082

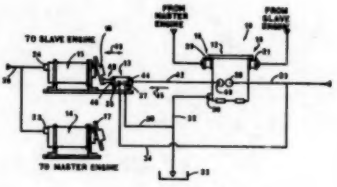
LOAD SHARING APPARATUS AND METHOD FOR MULTIPLE ENGINES

Jacob Kobelt, 6110 Oak Street, Vancouver, British Columbia, Canada V6M 2W2

Filed Jun. 17, 1985, Ser. No. 745,131

Int. Cl.⁴ F02D *25/00*

U.S. Cl. 60—710 **24 Claims**



1. A load sharing apparatus for sharing loads between coupled master and slave engines, the apparatus including:

(a) load comparison means having a comparison input means to receive load signals from each engine, and having a comparison output means to produce a differential signal reflecting comparison of the engine load signals, the differential signal being a pressurized control fluid signal.

(b) servo means having a servo control input adapted to receive the differential signal from the comparison output means, and a servo output means producing a servo signal in response to the differential signal, the servo means permitting the differential signal to act against a constant force,

(c) coupling means to couple the servo output means to a throttle actuator of the slave engine to change an initial throttle signal to the slave engine by an amount dependent on the servo signal to form a resultant throttle signal to the slave engine.

4,702,083

CONTROL SYSTEM AND METHOD FOR CONTROLLABLE OUTPUT TYPE HYDRAULIC FLUID PUMP OF AUTOMATIC TRANSMISSION PROVIDING DECREASED PUMP OUTPUT IN ASSOCIATION WITH THE ENGINE STARTING CONDITION

Shinya Nakamura; Seitoku Kubo, and Yutaka Taga, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Oct. 30, 1985, Ser. No. 792,980

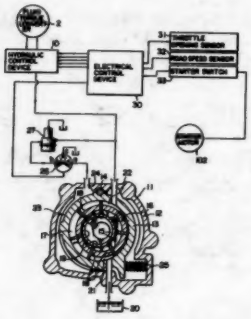
Claims priority, application Japan, Oct. 30, 1984, 59-228713; Oct. 30, 1984, 59-228714

Int. Cl.⁴ F04B *9/00*

U.S. Cl. 60—721 **28 Claims**

1. A control method of controlling output of a pump in a vehicle equipped with an internal combustion engine, a battery, a starter motor powered by said battery for starting up said engine, and a hydraulically actuated automatic transmission system including a hydraulic fluid pump for supplying pressurized fluid therefor, said pump being adapted to be driven either by said engine or a pump drive motor powered by said battery, said method comprising the steps of:

deciding whether or not said engine is being started by said starter motor; and



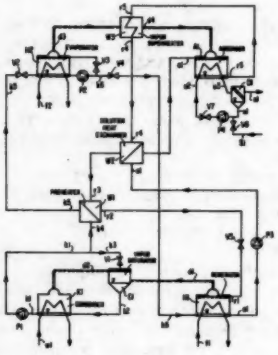
decreasing the output of said pump when it is thus decided that said engine is being started.

4,702,084
Patent Not Issued For This Number

4,702,085
METHOD AND APPARATUS FOR CONVERTING LOW TEMPERATURE HEAT INTO USEFUL HEAT

Karl-Heinz Gockel, and Chapar Mostofizadeh-Ghalamfarsa, both of Essen, Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit Beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Jun. 6, 1986, Ser. No. 871,771
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520565
Int. Cl.[4] F25B *15/00*
U.S. Cl. 62—101 **21 Claims**



1. A method for deriving useful heat from a fluid having a low temperature, comprising, in a closed circuit:

effecting a first heat exchange between a strong solution and an operating medium, which medium is in vapor form, for heating the operating medium;

effecting a second heat exchange between the strong solution coming from the first heat exchange and a weak solution for heating the weak solution;

effecting a third heat exchange between the strong solution coming from the second heat exchange and the operating medium, with the medium in liquid form, for heating the operating medium in liquid form;

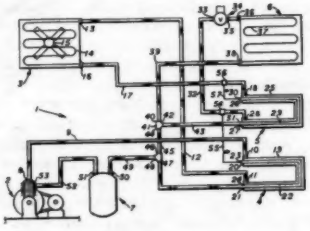
evaporating at least part of the operating medium coming from the third heat exchange to produce operating medium in vapor form which is employed in the first heat exchange; and

causing the operating medium coming from the first heat exchange to be absorbed by the weak solution coming from the second heat exchange for liberating useful heat by absorption.

4,702,086
REFRIGERATION SYSTEM WITH HOT GAS PRE-COOLER

John O. Nunn, Sr., Deer Park, and John O. Nunn, Jr., Pasadena, both of Tex., assignors to Turbo Coils Inc., Houston, Tex.

Filed Jun. 11, 1986, Ser. No. 872,808
The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.
Int. Cl.[4] F25B *41/00*
U.S. Cl. 62—113 **22 Claims**



1. In a method of refrigeration in which a refrigerant gas is compressed, then condensed to a hot liquid refrigerant and finally expanded at a selected rate to evaporate and thereby effect refrigerant cooling, the improvement which comprises cooling the hot gas refrigerant entering the condenser by evaporation of a small portion of said liquid before the expansion and evaporation of the main body of said liquid at said selected rate,

said evaporation of said small portion of liquid refrigerant is carried out by passing the same through an inner passage in heat exchange with the hot compressed refrigerant gas in a surrounding outer passage.

4,702,087

CEILING SUSPENDED AIR CONDITIONER

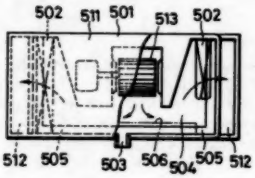
Isamu Nakajima; Yasuo Nakashima; Nobuyuki Miyazaki, and Kazuo Ishino, all of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 27, 1986, Ser. No. 844,644

Claims priority, application Japan, Mar. 29, 1985, 60-46060[U]; Mar. 29, 1985, 60-46063[U]; May 15, 1985, 60-71625[U]; Jul. 2, 1985, 60-100783[U]; Oct. 31, 1985, 60-167959[U]; Oct. 31, 1985, 60-167960[U]

Int. Cl.[4] F25D *21/14*

U.S. Cl. 62—285 3 Claims



1. In an overhead recessed air conditioner having a body, the said body having a room side, an intake vent in the central portion of said body on said room side, a supply vent on each side of said intake vent, a pair of heat exchangers for cooling and humidifying air arranged opposite to each other in said body and proximate to said supply vents respectively, a blower installed between the heat exchangers for pulling room air through said intake vent and for sending said air to both heat exchangers and for discharging said air through said supply vents, a condensate collecting pan mounted on the room side of the air conditioner body and having opposite ends under said heat exchangers, and a condensate discharge port affixed to said condensate collecting pan and opening to the exterior of said body for removing said condensate collecting on said collecting pan, the improvement comprising a drain extending within said condensate pan from a position under said pair of heat exchangers to said condensate discharge port and means forming a cover over said drain along the length of said drain proximate to said intake vent such that the condensate drainage flow along the condensate collecting pan from the heat exchangers to the discharge port is unaffected by air currents produced by the blower thereby improving drainage and preventing the condensate from overflowing the condensate collecting pan.

4,702,088

COMPRESSOR FOR REVERSIBLE REFRIGERATION CYCLE

Masao Ozu, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 26, 1986, Ser. No. 879,051

Claims priority, application Japan, Jun. 29, 1985, 60-143723

Int. Cl.[4] F25B *13/00*

U.S. Cl. 62—324.1 9 Claims

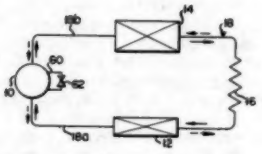
1. A compressor for a reversible refrigeration cycle which is connected to an indoor heat exchanger and an outdoor heat exchanger of the refrigeration cycle by means of first and second refrigerant pipes, respectively, whereby a refrigerant is sucked from either of the refrigerant pipes, compressed, and then discharged into the other refrigerant pipe, comprising:

a closed casing defining an accumulation chamber therein;

a compression section disposed in the casing and including a compression chamber, for compressing the refrigerant in the compression chamber and then discharging it into the accumulation chamber;

a drive section disposed in the casing, for driving the compression section;

a valve mechanism including a slider provided in the compression section to be movable between a first position where the first and second refrigerant pipes are connected to the compression chamber and the accumulation chamber, respectively, and a second position where the first and second refrigerant pipes are connected to the accumulation chamber and the compression chamber, respectively, so that the refrigerant is sucked from the first refrigerant pipe into the compression chamber and then discharged into the second refrigerant pipe when the slider is in the first position, and that the refrigerant is sucked ..om the second refrigerant pipe into the compression chamber and then discharged into the first refrigerant pipe when the



slider is in the second position, a first inlet hole formed in the compression section and having one end opening into the compression chamber and the other end connecting said the first refrigerant pipe, a second inlet hole formed in the compression chamber and the other end connecting with the second refrigerant pipe, a guide hole formed in the compression section so as to intersect the first and second inlet holes, a first delivery hole formed in the compression section and having one end connecting with the first inlet hole through the guide hole and the other end connecting with the accumulation chamber, and a second delivery hole formed in the compression section and having one end connecting with the second inlet hole through the guide hole and the other end connecting with the accumulation chamber;

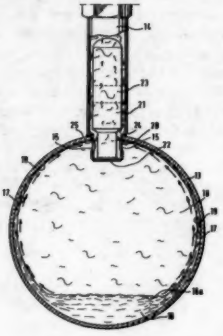
said slider being slidably inserted in the guide hole and including a first connecting hole adapted to connect with the first inlet hole when the slider is in the first position, a second connecting hole adapted to connect with the second inlet hole when the slider is in the second position, a first slit for connecting the first delivery hole and the first refrigerant pipe when the slider is in the second position, and a second slit for connecting the second delivery hole and the second refrigerant pipe when the slider is in the first position; and

a shift mechanism for moving the slider to change the direction of discharge of the refrigerant.

4,702,089
DEVICE FOR RETURNING OIL TO AT LEAST ONE COMPRESSOR IN A COOLING OR REFRIGERATING SYSTEM

Hans E. E. Olson, Sigurdsgat. 28, S-214 65 Malmö , Sweden

PCT No. PCT/SE85/00350, § 371 Date May 15, 1986, § 102(e) Date May 15, 1986, PCT Pub. No. WO86/01882, PCT Pub. Date Mar. 27, 1986
PCT Filed Sep. 16, 1985, Ser. No. 865,194
Claims priority, application Sweden, Sep. 17, 1984, 8404641
Int. Cl.[4] F25B *41/00*
U.S. Cl. 62—471 8 Claims



1. A device for returning oil to at least one compressor in a cooling or refrigerating system, in which the compressor sucks oil from at least one oil collecting container through at least one suction conduit connected to the collecting container and having one or more gas and oil intakes situated above the oil level in the collecting container, wherein the gas and oil intake connects onto the inside of the collecting container above the oil level and the gas and oil intake has a substantially smaller throughflow area than the collecting container to produce such a gas velocity in the gas and oil intake that after the oil collected in the collecting container has been foamed up at the start of the compressors, the gas is capable of elevating the collected oil on the inside of the collecting container to the suction conduit gas and oil intake above the oil level and carrying it farther into the suction conduit as said intake or intakes are connected to the inside of the collecting container and wherein the gas and oil intake is disposed in the side wall of an end portion of the suction conduit, which end portion extends radially down into the collecting container, and upper edge of the gas and oil intake connecting onto the inside of the collecting container.

4,702,090
MAGNETIC REFRIGERATION APPARATUS WITH CONDUCTIVE HEAT TRANSFER

John A. Barclay, Madison; Walter F. Stewart, Marshall; F. Coyne Prenger; Carl B. Zimm, both of Madison, and John P. Parsons, South Milwaukee, all of Wis., assignors to Astronautics Corporation of America, Milwaukee, Wis.

Filed Oct. 24, 1986, Ser. No. 922,746
Int. Cl.[4] F25B *21/02*
U.S. Cl. 62—3 43 Claims

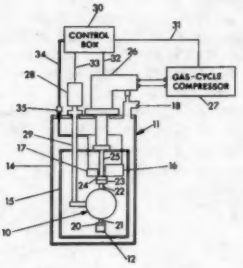
1. Magnetic refrigeration apparatus comprising:

(a) magnetic material which exhibits the magnetocaloric effect mounted for movement;

(b) means for producing a magnetic field at a position over a portion of the magnetic material such that each point of the magnetic material can be moved into and out of the magnetic field as the material is moved;

(c) a high temperature heat extractor including a solid conductive heat transfer conduit extending to form a continuous conductive path from a heat transfer plate adjacent to the portion of the magnetic material in the magnetic field to a high temperature interface terminal;

(d) a low temperature heat extractor including a solid conductive heat transfer conduit extending to form a continuous conductive path from a heat transfer plate adjacent to the magnetic material at a position outside of the magnetic field to a low temperature interface terminal; and

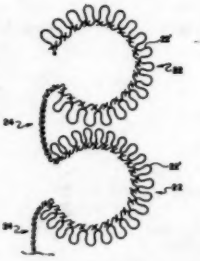


(e) means for containing a heat transfer gas in the space between the magnetic material and the heat transfer plates such that heat is transferred from the heat transfer plate of the low temperature extractor to the magnetic material through the gas and heat is transferred from the magnetic materal through the gas to the heat transfer plate of the high temperature extractor conduit.

4,702,091
CUFF MEMBER AND SOCK

David S. Good, and Daniel H. Good, both of 1634 19th Ave., NE., Hickory, N.C. 28601

Filed Sep. 30, 1985, Ser. No. 781,672
Int. Cl.[4] D04B *9/54*
U.S. Cl. 66—171 10 Claims



1. A tubular circularly-knitted cuff member comprising a plurality of circumferentially-extending rib portions and a plurality of circumferentially-extending connecting portions integrally knit with one another in axially alternating arrange-

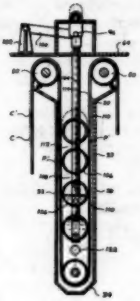
ment along said cuff member, each said rib portion including a relatively stretchable, low denier ground yarn and a relatively non-stretchable, high-denier terry yarn knitted in plated relationship in a terry pile fabric construction causing said rib portion to project radially-outwardly and to be axially rounded with respect to said connecting portions and each said connecting portion including knitted stitches essentially only of said ground yarn knitted in a plain non-terry fabric construction, said cuff member being stretchable axially between a relaxed condition wherein said rib portions are disposed closely axially adjacent one another and said connecting portions are generally not visible from outwardly of said cuff member and an extended condition wherein said rib portions and said connecting portions are elongated with said rib portions spaced axially from one another.

4,702,092

APPARATUS FOR WET PROCESSING A CONTINUOUS TRAVELING WEB OF MATERIAL

James K. Turner, Lincolnton, N.C., assignor to Gaston County Dyeing Machine Company, Stanley, N.C.

Filed Dec. 19, 1984, Ser. No. 683,720
Int. Cl.[4] D06F 5/02
U.S. Cl. 68—53 **40 Claims**



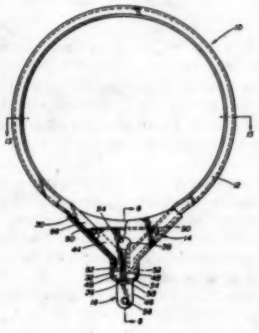
38. An apparatus for wet processing a continuous traveling web of textile sheet material having tufts projecting therefrom, comprising a container having two spaced parallel walls for containing processing liquid, means for directing a traveling continuous web of material through said container and the processing liquid therein in a U-shaped path having two spaced parallel reaches respectively adjacent and parallel to said container walls, agitating means disposed in the liquid in said container in the space between said reaches and adjacent said traveling web material therethrough, the tufts of said material projecting therefrom in facing relation to said agitating means during travel of said material through said reaches, and means for reciprocating said agitating means generally parallel to said reaches and relative to said material and liquid, said agitating means having a plurality of at least three individual enlarged elongate liquid displacement cylinders and frame means affixing said displacement cylinders in generally parallel spaced relation extending tranvsersely across the width of said traveling web material with said displacement members being substantially disconnected form one another forming open areas intermeadiate said displacement cylinders, said displacement cylinders projecting from a common central plane of their reciprocal movement outwardly toward each reach of said web to define relatively narrow localized spacings between said displacement members and said container walls, said narrow localized spacings being substatantially narrower than the spacing between said common plane and said walls at said open areas between said displacement members, and each said displacement cylinder having a sufficient radius that said spacing between said common plane and each said wall is at least three times greater than said localized spacings for cccupying a sufficiently large extent of said container transversely of said reaches of said web in relation to said spacing between said common plane and said walls at said open areas so that relatively low velocity reciprocal movement of said agitating means causes said displacement members to displace adjacent liquid in said open areas through said narrow localized spacings at substantially higher velocity uniformly in each direction of reciprocal movement of said agitating means to force said liquid to be vigorously applied to said web material, said displacement cylinders being unequally spaced from each other to avoid repetitive patterned application of said liquid to said material upon reciprocation of said agitating means, means for circulating said liquid through said container and for removing lint therefrom comprising pump means for delivering liquid into said container at the bottom thereof, through means for receiving and containing overflow of said liquid from the top of said container for maintaining said liquid at a predetermined level in said container, said material directing means including means for directing said material through said trough means after passing through said container, conduit means between said trough means and said pump means for delivering said overflow liquid to said pump means, and screen means in said trough means about said conduit means for separating lint from said overflow liquid entering said conduit means.

4,702,093

LOCKABLE METER CLAMP RING

Norman B. DeWalch, 3668 Delmonte Dr., Houston, Tex. 77019

Filed Jan. 7, 1987, Ser. No. 1,125
Int. Cl.[4] B65D 55/14; G10R 11/04
U.S. Cl. 70—164 **11 Claims**



1. In a meter clamp ring assembly for securing a meter to a flanged meter housing by means of a split ring, having a generally U-shaped cross-section, which surrounds the meter base and flange on the housing, the improvement comprising:

(a) the ring having downwardly extending arms, generally tangent to the perimeter of the ring, and each arm ending in a radial extension, and an inwardly extending lug;

(b) a generally Y-shaped housing, having a mouth to receive the ring arms and a throat to receive the extensions, and so arranged that the throat of the Y holds the ring extensions adjacent to one another when inserted therein, and the arms of the ring lie within the mouth and along the Y-shaped sides of the housing;

(c) a spreader, which has generally Y-shaped legs and a depending stem mounted within the housing, with the stem extending through the throat of the housing, and arranged to hold the ring arms against the sides of the mouth of the housing, when the extensions are in the throat; and

(d) both the housing and the spreader having co-axial holes therethrough which are aligned for the insertion of a

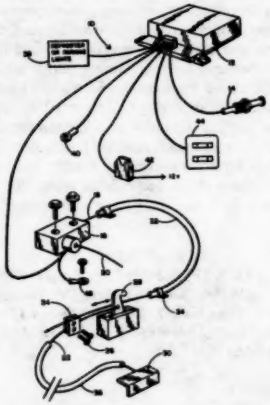
locking means when the ring arms are held against the sides of the mouth by the spreader legs.

4,702,094

ELECTRIC SOLENOID OPERATION VEHICLE HOOD LOCK

Larry O. Peterson, Reseda, Calif., assignor to Crimestopper Security Products, Inc., Simi Valley, Calif.

Filed Nov. 27, 1985, Ser. No. 802,424
Int. Cl.[4] E05B *65/19*
U.S. Cl. 70—241 **7 Claims**



1. In combination with a vehicle having a hood or trunk lid and an ignition switch, a solenoid activated locking system primarily for selectively enabling and disabling remote manual release devices in the vehicle permitting the opening of the hood or trunk lid by the release of a latch from the interior of the vehicle; the locking system comprising:

a solenoid;

means controlled by said solenoid for engaging said latch and selectively preventing and enabling activation of said latch by said manual release device; and

means controlling said solenoid and responsive to limited access switching within said vehicle interior for selectively activating said solenoid;

said solenoid controlling means comprising means responsive to each of the following events for activating said solenoid:

(a) turning the ignition switch of said vehicle ON;

(b) turning the ignition switch of said vehicle OFF;

(c) activating said limited access switching means for a period of time greater than a selected minimum and less than selected maximum after said vehicle ignition switch has been turned ON for a selected minimum period of time; and

(d) closing said lid.

4,702,095

ELECTRO-MECHANICAL LOCKING DEVICE

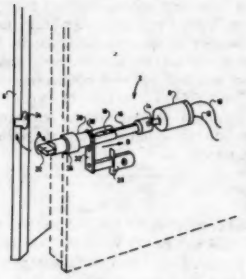
Eldad Ben-Asher, Shderot Bialik 23, Ramat Hasharon 47206, Israel

Filed Jan. 9, 1987, Ser. No. 1,849
Claims priority, application Israel, Feb. 5, 1986, 77797
Int. Cl.[4] E05B *47/00*
U.S. Cl. 70—279 **5 Claims**

1. An electro-mechanical locking device, comprising

a dead bolt having a slot at one end portion and having at its other end portion a tip configured to enter a preformed shaped aperture while assuming at least one orientation and to be blocked by rim portions of said aperture while assuming at least one other orientation;

an electrically operable means for applying a rotary movement to a guide member for the dead bolt, said guide member being coupled to said bolt by means of said slot, and



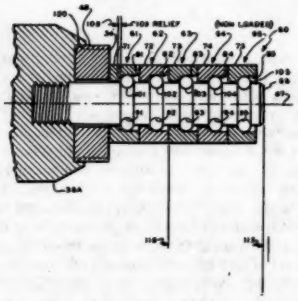
a key operated unlocking and locking actuator means connected to said bolt for effecting linear retraction and extension movements of said bolt when acted upon by said key, while allowing rotary movement of said bolt by said guide member when said guide member is acted upon by said electrically operable means.

4,702,096

APPARATUS AND PROCESS FOR PROVIDING TUBING WITH AT LEAST ONE INTERNAL SPIRAL GROOVE OR FIN

Francis J. Fuchs, Jr., P.O. Box 10016, Naples, Fla. 33941

Filed Jun. 23, 1986, Ser. No. 877,215
Int. Cl.[4] B21C *37/20*
U.S. Cl. 72—68 **19 Claims**



1. Apparatus for providing the internal portion of tubing with at least two internal spiral grooves to provide said tubing internal portion with at least one internal spiral fin, comprising:

spinner means provided with at least two external spiral ridges;

mounting means for mounting said spinner means rotatably, said spinner means and said mounting means for being positioned internally of said tubing, said mounting means including an internal tube forming member for residing internally of said tubing and having a forward portion provided with a recess complementary in shape to said spinner means and said recess for receiving a predetermined rearward portion of said spinner means, said mounting means including a headed bolt having a shaft including a rearward portion secured to the forward portion of said internal tube forming member and a thrust

washer mounting on said shaft, said spinner means mounted rotatably on said shaft intermediate said forward portion of said internal tube forming member providing said recess and said thrust washer with said spinner means rearward portion received in said recess, and said mounting means including a hydrostatic bearing for preventing direct frictional engagement between said spinner means and said forward portion of said internal tube forming member providing said recess and between said spinner means and said thrust washer; and

upon relative movement of said tubing with respect to said spinner means in a predetermined direction, said internal portion of said tubing engaging said spiral ridges and imparting rotation to said spinner means to cause said spiral ridges to provide said tubing internal portion with said internal spiral grooves.

4,702,097

PROCESS FOR THE BENDING OF ROD-LIKE MATERIALS

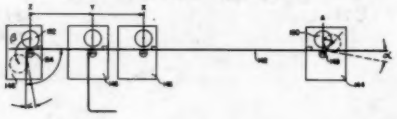
Helmut Zahlaus, Königsberger Strasse 27, D-6239 Kriftel, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 730,475, May 3, 1985, abandoned. This application Mar. 14, 1986, Ser. No. 839,688

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1983, 3312397

Int. Cl.⁴ B21D *7/022*

U.S. Cl. 72—306 **8 Claims**



1. A method for the bending of rod-like materials, such as reinforced steels, comprising providing first and second bending carriages each with one bending mandril and a bending crank arranged rotatively around said mandril, movably arranging said carriages each along the material, immovably holding the material by the bending mandril and bending crank of the first carriage by bending said material at an angle α resulting in only an elastic deformation, moving said second bending carriage along the material to a desired position on the material while holding said material by said bending mandril and bending crank of said first bending carriage, releasing said material held by said first bending carriage and plastically forming the material to desired shapes by the bending mandril of the second bending carriage, immovably holding said material by the bending mandril and bending crank of said second bending carriage by bending said material at an angle α resulting in only an elastic deformation, and moving said first bending carriage along the material to a desired position on the material while holding said material by said bending mandrel and bending crank of said second bending carriage, releasing said material held by said bending mandril and bending crank of said second bending carriage and plastically forming the material in desired shapes by the bending mandril of the first bending carriage.

4,702,098

REDRAW CARRIAGE ASSEMBLY AND SLIDE MOUNT

Tom Pora, Arvada, and Tony Grandinetti, Westminster, both of Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Oct. 11, 1985, Ser. No. 786,446

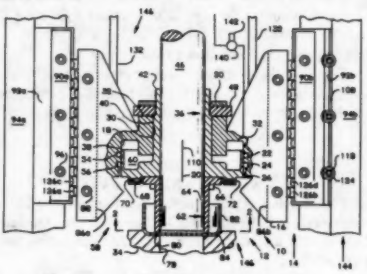
Int. Cl.⁴ B21D *24/08*

U.S. Cl. 72—351 **9 Claims**

1. A redraw carriage assembly and slide mount for use in a metal working crank and slide press of the type having a redraw die, having a redraw punch that is reciprocated along a longitudinal axis and into said redraw die, and having a redraw carriage that is slidably mounted to said press and that is actuated along said longitudinal axis to positions both proximal to and distal from said redraw die, which redraw carriage assembly comprises:

a carriage body, having a larger cylindrical bore that is disposed circumferentially around said longitudinal axis and that opens toward said redraw die, and having a smaller cylindrical bore that is disposed circumferentially around said longitudinal axis, that communicates with said larger cylindrical bore, and that opens through said carriage body distal from said redraw die;

a clamping piston, having a larger cylindrical portion that is



slidably disposed in said larger cylindrical bore, having a smaller cylindrical portion that is slidably disposed in said smaller cylindrical bore, and having a punch bore that extends through both of said cylindrical portions, and that is disposed circumferentially around said redraw punch:

a redraw sleeve having bore means therein for receiving said redraw punch, being disposed circumferentially around said redraw punch, having a clamping face that is disposed circumferentially around said bore means, and being operatively attached to said clamping piston; and

said clamping piston includes means for adjustably limiting movement of said redraw sleeve in the direction toward said redraw die.

4,702,099

METHOD FOR AUTOMATICALLY ADJUSTING THE ROLLS IN A UNIVERSAL TYPE MILL STAND

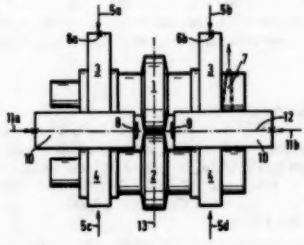
Hans Sturm, Oberhausen, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 10, 1986, Ser. No. 818,171

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1985, 3501622

Int. Cl.⁴ B21B *13/10, 31/16, 37/08*

U.S. Cl. 72—366 **4 Claims**



1. Method for automatically adjusting the rolls in a universal type rolling mill stand the stand including horizontally positioned upper and lower rolls and vertically positioned vertical rolls comprising the steps of:

adjusting the lower roll in a vertical direction and corresponding to its rolling diameter and in particular relation to a horizonally extending center plane of rolling;

adjusting the upper roll towards the lower roll at a relatively low speed until rolling pressure is indicated through separate pressure measurement;

retracting slowly the upper roll until rolling pressure has reduced to zero;

releasing the upper roll as far as its axial disposition is concerned;

moving the vertical rolls towards each other, said vertical rolls being in abutment with said upper roll so that upon movement of the vertical rolls the upper roll is shifted to a position such that both said vertical rolls abut the sides of the lower roll;

arresting the axial position of the upper roll;

moving all rolls to attain rolling pressure; and

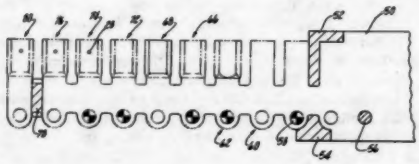
ascertaining values indicative of respective positions for the rolls after completion of all preceding steps.

4,702,100

ADJUSTABLE CLEVIS

Richard M. Levine, 35179 Northmont, Farmington Hills, Mich. 48018; Stuart H. Levine, 4204 Cherryhill Dr., Orchard Lake, Mich. 48033, and Leon Levine, 22353 Greenview, Southfield, Mich. 48075

Filed Dec. 7, 1981, Ser. No. 328,045
Int. Cl.[4] B21J *11/00*
U.S. Cl. 72—404 **1 Claim**



1. A method of manufacturing a clevis of the type having a main body and a pair of discrete, opposed clevis members each having a surface conforming to said body and an ear extending outwardly beyond said body, comprising the following steps, performed in succession at the operating stations of a progressive die:

(A) providing a substantially flat sheet of substantially rigid, formable material;

(B) forming a series of through-holes at spaced points along said sheet;

(C) shearing a portion of said sheet to define a substantial part of the periphery of said clevis members;

(D) forming said conforming surface of each of said clevis members by coining a portion of said sheet;

(E) then, shearing the remaining portion of said sheet to define the remaining part of said clevis member.

4,702,101

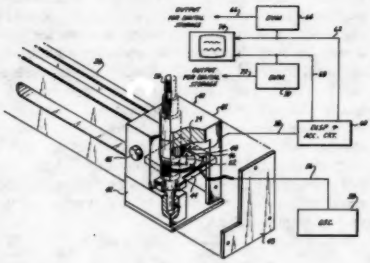
APPARATUS AND METHOD FOR TESTING THE CALIBRATION OF A HARD DISK SUBSTRATE TESTER

David C. Abbe, and George A. Burt, Jr., both of San Jose, Calif., assignors to ProQuip, Inc., Santa Clara, Calif.

Filed Aug. 12, 1985, Ser. No. 764,654
Int. Cl.[4] G01C *25/00*
U.S. Cl. 73—1 R **20 Claims**

1. A testing apparatus for testing the calibration of a hard disk substrate tester that comprises at least one non-contact detector for sensing displacement in an axial direction of a surface of a rotatable hard disk substrate having an axis, comprising:

a. positioning means for positioning a calibrator surface a distance in detectable proximity to said hard disk surface tester detector; and



b. driving means for non-rotatably driving the calibrator surface in the direction of the axis at a predeterminable rate of acceleration in relation to the detector.

4,702,102

DIRECT READOUT DISSOLVED GAS MEASUREMENT APPARATUS

Denis Hammerton, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 28, 1983, Ser. No. 566,307
Int. Cl.[4] G01N *7/00*; B01D *53/22*
U.S. Cl. 73—19 **2 Claims**

1. Apparatus for rapidly and continuously measuring the percentage of dissolved gas in a warm fluid moving within a conduit, comprising:

a minimum internal volume pressure sensor;

an elongated tube formed of a thin-walled gas-permeable membrane, said tube being closed at one end, having a maximum surface area to internal volume ratio and having its other end coupled to said sensor in a pressure-tight relationship with the combined internal volume of said pressure sensor and said elongated tube being altered to produce an optimum minimum internal volume within said combined volume; and

means for supporting said dissolved gas measuring apparatus such that the external surface of one portion of said gas-permeable tube is exposed to air at atmospheric pressure where the area of said air-exposed external surface is large enough to permit fluid vapors from the measured fluid within said tube to pass through the tube wall and into the surrounding air while at the same time being small enough to limit the rate of air infiltration into said tube, to thereby

preclude dissolved gas measurement errors resulting from infiltrating air and fluid vapors that might otherwise condense, within said gas permeable tube.

4,702,103

METHOD OF QUALITY GRADING IN UNIFORMITY TESTS OF ROTORS, IN PARTICULAR OF AUTOMOBILE TIRES

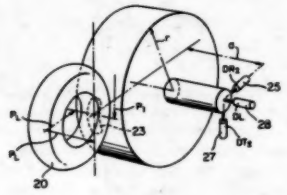
Friedrich Wenz, Seeheim, Fed. Rep. of Germany, assignor to Hofmann Werkstatt-Technik GmbH, Pfungstadt, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 864,915

Claims priority, application Fed. Rep. of Germany, May 20, 1985, 3518085

Int. Cl.⁴ G01M *17/02*

U.S. Cl. 73—146 **4 Claims**



1. A method of quality grading a rotary article such as a vehicle tire comprising rotating the article and during rotation of the article imposing load variations on the article, using the load variations to generate a variation function representing article quality, deriving root mean square or arithmetic mean values of the variation function and comparing the root mean square or arithmetic mean values with prescribed limit values for the function.

4,702,104

METHOD AND DEVICE FOR DETECTING WHEELS WITH DEFORMED TREADS IN RAILROAD VEHICLES

Karl R. S. Hallberg, Drottningvägen 35, S-181 32 Lidingö, Sweden

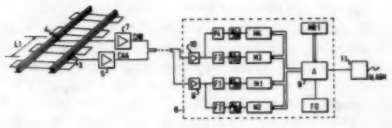
PCT No. PCT/SE85/00308, § 371 Date Apr. 14, 1986, § 102(e) Date Apr. 14, 1986, PCT Pub. No. WO86/01167, PCT Pub. Date Feb. 27, 1986

PCT Filed Aug. 14, 1985, Ser. No. 855,490

Claims priority, application Sweden, Aug. 14, 1984, 8404092

Int. Cl.⁴ G01M *17/00*

U.S. Cl. 73—146 **10 Claims**



1. Method of detecting deformed wheels in railroad vehicles moving along a track section where at least two wave motion sensors (3,4;12–15) are positioned at the track while being in mechanical rail contact, the signals from the wave motion sensors being fed to an analytic circuit whereby an output signal with relatively low frequency is received from two of the wave motion sensors (3,4;12,13) spaced apart a predetermined distance L1, and an output signal with relatively high frequency is received from at least one of the wave motion sensors (3,4;14,15), characterized in that a time lag is indicated between substantially uniform signals received from the wave motion sensors (3,4;12,13) emitting an output signal with relatively low frequency, the vehicle speed being determined with the guidance of the distance L1 and the preset time lag; that the points of time for wheel passage are indicated in each one of the wave motion sensors (3,4;14,15) emitting an output signal with relatively high frequency whereby this timing, unless the wave motion sensor for relatively low frequency and the wave motion sensor for relatively high frequency are one and the same or are situated directly at the same position, is performed with the guidance of vehicle speed and the distance along the rail to one of the wave motion sensors (3,4;12,13) emitting an output signal with relatively low frequency; that the curvatures of the signal from each one of the wave motion sensors (3,4;14,15) emitting an output signal with relatively high frequency are individually analyzed and digitally processed; that the processed output signals from the wave motion sensors (3,4;14,15) emitting an output signal with relatively high frequency are individually compared with several signal levels permanently stored in a digital memory (MR1;MR2), said levels being obtained from reference measurements on wheels having known characteristics such as wheels without deformations and with different types of deformation, and e.g. on recordings of railroad vehicles travelling at various speeds; and that the presence of wheel deformation is analyzed with the guidance of this comparison.

4,702,105

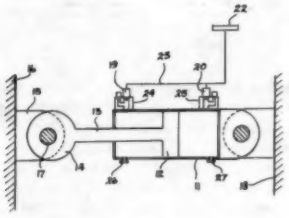
SNUBBERS AND METHODS AND APPARATUS FOR THE IN-PLACE TESTING THEREOF

John M. Raymont, Jr., Costa Mesa, Calif., assignor to Paul-Munroe Hydraulics, Inc., Orange, Calif.

Filed Mar. 28, 1986, Ser. No. 845,200

Int. Cl.⁴ G01M *19/00*

U.S. Cl. 73—168 **13 Claims**



1. A device for coupling to and protecting a moveable object from shock, said device comprising

a cylinder having first and second ends, said cylinder containing hydraulic fluid,

a piston disposed within said cylinder, said piston moveable between said first and second ends and having a piston rod coupled to said piston and extending out of said cylinder,

a seal coupled to said piston and disposed between said piston and said cylinder, said seal for preventing the flow of said hydraulic fluid around said piston,

a first manifold having first and second ports in fluid communication with each other, the first port being coupled to said cylinder adjacent said first end for fluid communication therewith,

a second manifold having first and second ports in fluid communication with each other, the first port being coupled to said cylinder adjacent said second end for fluid communication therewith,

control valves coupled to each of said second ports of said first and second manifolds and to each other, said control valves permitting the flow of hydraulic fluid external to said cylinder from said first end to said second end, and from said second end to said first end responsive to movement of said piston, said manifolds each having means for isolating said first and second ports thereof from each other and for coupling to a test machine for independent

fluid communication with said first and second ports of the respective manifold,

whereby said seal can be tested in isolation from said control valves and said control valves can be tested in isolation from said seal while said device is in place.

4,702,106

METHOD FOR DETERMINING THE HORIZONTAL AIRSPEED OF HELICOPTERS IN LOW SPEED RANGES

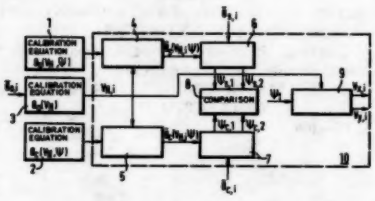
Wolfgang Hassenpflug, Freiburg, and Rainer Schwäble, Garbsen, both of Fed. Rep. of Germany, assignors to Litef GmbH, Freiburg im Breisgau, Fed. Rep. of Germany

Filed Jun. 6, 1986, Ser. No. 872,044

Claims priority, application European Pat. Off., Jun. 11, 1985, 85107190.2

Int. Cl.[4] G01C *21/10*

U.S. Cl. 73—181 6 Claims



1. A method for determining the horizontal airspeed of a helicopter in low speed ranges comprising the steps of:

(a) determining a first relationship between collective pitch θ_o and airspeed V_H for said helicopter; and

(b) determining a second relationship for said helicopter between longitudinal control value $\overline{\theta}_s$ and air-speed V_H for a plurality of directions of incident air flow ψ; and

(c) determining a third relationship for said helicopter between lateral control value $\overline{\theta}_c$ and airspeed V_H for a plurality of directions of incident air flow ψ; then

(d) storing said first, second and third relationships; then

(e) detecting values $\overline{\theta}_{o,i}$, $\overline{\theta}_{c,i}$ and $\overline{\theta}_{s,i}$; then

(f) determining horizontal airspeed magnitude $V_{H,i}$ from said first stored relationship and $\overline{\theta}_{o,i}$; then

(g) deriving a longitudinal control profile $\overline{\theta}_s(V_{H,i}, \psi)$ from said airspeed magnitude and the values of said second stored relationship; and

(h) deriving a lateral control profile $\overline{\theta}_c(V_{H,i}, \psi)$ from said airspeed magnitude and the values of said third stored relationship; then

(i) applying the detected value of lateral control $\overline{\theta}_{c,i}$ to said lateral control profile to determine a corresponding first pair of incdient angles $\psi_{c,1}$ and $\psi_{c,2}$; and

(j) applying the detected value of longitudinal control $\overline{\theta}_{s,i}$ to said longitudinal control profile to determine a corresponding second pair of incident angles $\psi_{s,1}$ and $\psi_{s,2}$; then

(k) comparing said first and second pairs of incident angles;

(l) selecting a value common to said incident angle pairs as the incident angle value ψ_i; and then

(m) calculating the components of horizontal airspeed as:

$$V_{x,i} = V_{H,i} \cos \psi_i$$

$$V_{y,i} = V_{H,i} \sin \psi_i.$$

4,702,107

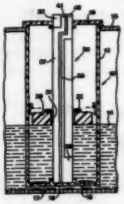
DEVICE FOR DETECTING THE LEVEL OF A LIQUID CONTAINED IN A TANK

Giampaolo Guerrini, and Franco Sommacal, both of Ivrea, Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Jun. 4, 1986, Ser. No. 870,444

Int. Cl.[4] G01F *23/68*

U.S. Cl. 73—319 9 Claims



1. In a device for detecting the level of a liquid contained in a tank, comprising a vertical bar inserted in the tank and a float movable up and down the bar to follow the variations in the level of the liquid, the combination comprising:

a printed circuit borne by said vertical bar and including at least one vertical strip of resistive hardened paste along a longitudinal axis of the bar and a plurality of conductive elements supported by said bar, wherein the vertical strip of resistive paste include one terminal and different sections defining different resistive amounts with respect to said one terminal, and wherein said conductive elements are disposed parallel to one another and transverse with respect to said bar and have ends electrically connected to different sections of said strip of resistive paste;

a metal element mounted on the float and sliding on the printed circuit to contact selectively one element of the plurality of conductive elements to be connected to a different section of the strip of resistive paste in response to any up and down movement of the float, due to a variation of level of the liquid; and

connecting means for electrically connecting said metal element with another terminal of the printed circuit to provide a different resistive amount between the one and the other terminal corresponding to a different level of the liquid in the tank.

4,702,108

METHOD AND APPARATUS FOR MEASURING THE ISOMETRIC MUSCLE STRENGTH OF MULTIPLE MUSCLE GROUPS IN THE HUMAN BODY

Louis R. Amundsen, New Brighton; Robert P. Patterson, St. Anthony; Tanya L. Baxter, Minneapolis; Glenn N. Scudder, Edina; Wayne O. Duescher, Roseville; Willis E. Dahlman, Cambridge; Gary W. Schukar, White Bear Lake, and Clarence I. Steinback, Edina, all of Minn., assignors to Regents of the Univ. of Minnesota, Minneapolis and Twin City Surgical, Inc., St. Paul, both of, Minn.

Continuation-in-part of Ser. No. 748,088, Jun. 24, 1985, abandoned. This application Feb. 4, 1986, Ser. No. 825,851

Int. Cl.[4] A61B *5/22*

U.S. Cl. 73—379 13 Claims

7. An isometric muscle strength testing chair apparatus for measuring the isometric muscle strength of any of a plurality of muscle groups in a human subject's body, the apparatus comprising:

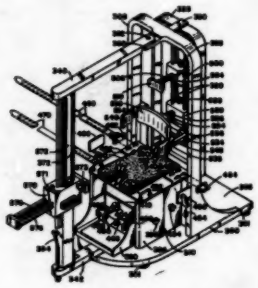
(a) a support frame;

(b) transducer means interconnected to the support frame for measuring the force exerted by the muscle groups selected for testing, the trar ducer means remaining substantially stationary while the muscle groups selected for

testing exert a force thereon so as to provide for isometric strength testing;

(c) vertical track means for adjustably positioning the transducer means in association with the muscle groups selected for testing;

(d) stabilization means for selectively engaging and immobilizing various parts of the human subject's body as required to enable the muscle groups selected for testing to be tested while isolated from the other muscle groups of the human subject's body;



(e) a seat assembly mounted on the support frame; and

(f) pivot mount means for supporting the vertical track means for pivotal movement through an arc about a vertical axis centered proximate the seat assembly.

4,702,109

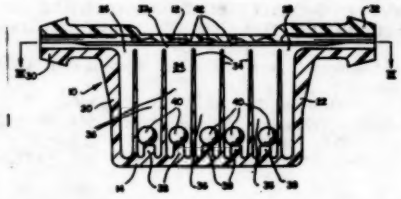
IN-LINE HYDROMETER

Frank J. Viola, Uniondale, N.Y., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Apr. 21, 1986, Ser. No. 854,270

Int. Cl.[4] G01N 9/10

U.S. Cl. 73—440 **8 Claims**



1. An in-line hydrometer for connection in an engine coolant system between a radiator filler neck and an overflow reservoir, said hydrometer comprising:

a body that includes an internal cavity having a bottom surface, said body further having first and second openings respectively located on opposite sides of said body, and that communicate between said internal cavity and the outer surface of said body;

a plurality of dividers that extend into the cavity of said body and that cooperate with said body to define channels between adjacent dividers;

a plurality of balls having different specific gravity, each of said balls being located in a respective one of said channels; and

a plurality of pedestals, each of said pedestals being located in a respective one of said channels adjacent the bottom of said channel, said pedestals maintaining said balls apart from the bottom surface of said internal cavity.

4,702,110

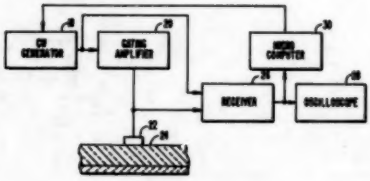
METHOD AND APPARATUS FOR MEASURING METAL HARDNESS UTILIZING LONGITUDINAL AND TRANSVERSE ULTRASONIC WAVE TIME-OF-FLIGHT

Albert C. Holt, Trinidad, Calif., assignor to J. A. Green Company, Trinidad, Calif.

Continuation-in-part of Ser. No. 746,917, Jun. 20, 1985, Pat. No. 4,602,511. This application Jul. 25, 1986, Ser. No. 890,597

Int. Cl.[4] G01M 7/00

U.S. Cl. 73—573 **22 Claims**



1. A method for measuring average hardness in a metal comprising:

applying a longitudinal ultrasonic signal to a first end of said metal;

applying a transverse ultrasonic signal to said first end of said metal;

detecting said longitudinal and transverse signals at said first end after reflection from a second end of said metal;

measuring the time-of-flight, t_1, taken by said longitudinal signal to travel from said first end to said second end and back;

measuring the time-of-flight, t_2, for said transverse signal to travel from said first end to said second end and back; and

determining the average hardness in said metal from t_1 and t_2.

4,702,111

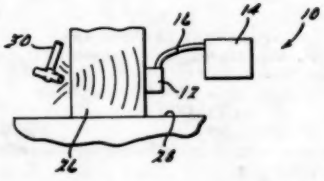
SONIC WOOD TESTING APPARATUS AND METHOD

John F. Holland, Lansing, Mich., assignor to American Energy Services, Inc., Richmond, Mich.

Filed Apr. 1, 1986, Ser. No. 851,499

Int. Cl.[4] G01N 29/04

U.S. Cl. 73—579 **9 Claims**



1. A non-destructive sonic testing apparatus for ascertaining the integrity of wooden members comprising:

means for receiving sonic energy imparted to said wooden member and generating a signal in response to said received sonic energy;

analyzing means for receiving said signal and performing an analysis thereon to determine energy levels as a function of frequency for said signal, said analyzing means also being operative to determine at least two criteria selected from the group comprising the mean, mode, median and range for said energy levels as a function of frequency and to determine the relative relationship between said two criteria; and

means responsive to the relative relationship between said

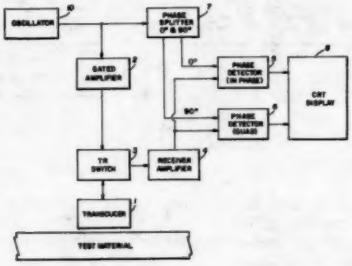
two criteria to provide a visual indication representative of the condition of said wooden member.

4,702,112

ULTRASONIC PHASE REFLECTOSCOPE

William E. Lawrie; Thomas Powers, Jr., both of Lynchburg, Va., and Joseph W. Brophy, Redmond, Wash., assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Aug. 12, 1985, Ser. No. 764,912
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—629 **13 Claims**



1. An ultrasonic apparatus for testing a material, comprising:

an oscillator for generating an oscillator signal at a selected frequency in the ultrasonic range;

transducer-receiver means connected to said oscillator for transmitting an ultrasonic signal at the selected frequency into the material from saids transducer-receiver means and for receiving an echo signal back from the material at that same transducer-receiver means;

phase detector means connected to said transducer means and to said oscillator for mixing the echo signal with an in-phase oscillator signal to produce a first display signal, and with a quadrature oscillator signal to produce a second display signal; and

display means connected to said phase detector means for generating an image having a configuration which is dependent upon said first and second display signals and which varies according to the presence and depth of a reflecting structure in the material which produces said echo signal.

4,702,113

PRESSURE TRANSDUCER

William Wareham, Marion, Mass., assignor to Dynisco, Inc., Norwood, Mass.

Filed Apr. 4, 1986, Ser. No. 848,300
Int. Cl.[4] G01L *7/08, 9/04*
U.S. Cl. 73—706 **24 Claims**

1. A pressure transducer particularly for low pressure measurement comprising,

an elongated frame having means defining a passage, a flat surface at one end thereof, and mating means adjacent the flat surface,

a capillary tube extending through the frame and terminating at one end adjacent another end of the frame,

a coupler closing the other end of the frame and defining with the frame a chamber in communication with the capillary tube,

a liquid filled deformable sensor including a cap member having an internal recess therein and mating means adjacent thereto for connecting with the mating means of the frame, said recess and flat surface defining a thin disc-shaped compartment in communication with another end of the capillary tube,

a liquid filling the capillary tube, chamber and compartment for applying the pressure exerted against the coupler to the sensor,

said cap member having an outer substantially flat top surface having a diametrically disposed raised beam extending across said top surface and defining a gage receiving surface,

and a plurality of separately disposed strain gage means

attached to said gage receiving surface and extending in spaced linear relationship along said raised beam,

at least one of said gage means sensing compressive strains and disposed over the periphery of the disc-shaped compartment,

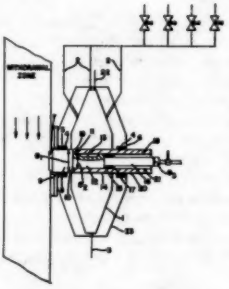
at least another of said gage means sensing tensile strains and disposed at the area over the center of the disc-shaped compartment.

4,702,114

DEVICE FOR WITHDRAWING AND CONDITIONING SAMPLES OF MATERIALS IN SOLID, LIQUID OR GASEOUS FORM, FOR THE PURPOSE OF ANALYSIS THEREOF

Claude Cabannes, Eygalieres, France, assignor to OMYA S.A., France

Filed Apr. 25, 1985, Ser. No. 727,089
Claims priority, application France, May 7, 1984, 84 07244
Int. Cl.[4] G01N *1/20, 1/22*
U.S. Cl. 73—863.85 **9 Claims**



1. A device for withdrawal of a fixed volume of powdered, liquid or gaseous material from a withdrawal zone and for

conditioning the withdrawn materials for purposes of analysis comprising:

(a) a retractable cylindrical probe in which there is provided a cavity of known capacity,

(b) a retractable sleeve coaxially disposed over the probe for permitting or preventing access to the cavity,

(c) a substantially closed chamber in which the probe and sleeve are disposed for reciprocal movement into and out of the withdrawal zone, said chamber including means for conditioning the material withdrawn by the probe, whereby (1) the probe and sleeve may be extended from the chamber into the withdrawal zone, (2) the sleeve may be retracted to fill the cavity, (3) the sleeve may be extended to seal the cavity, (4) the probe and sleeve may be retracted from the withdrawal zone back into the closed chamber and finally (5) the sleeve may be retracted within the chamber to permit conditioning of the withdrawn material.

4,702,115

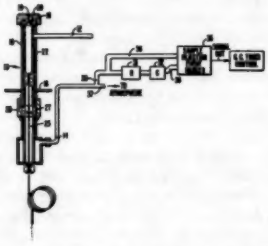
SAMPLE INJECTION TIMER FOR CHROMATOGRAPHIC APPARATUS

Earl Brabandt, 6424 Sunnyvfield Way, Sacramento, Calif. 95823, and Robert R. Freeman, 9160 Madison Ave., Fair Oaks, Calif. 95662

Filed Feb. 25, 1986, Ser. No. 833,306

Int. Cl.[4] G01N *30/12*

U.S. Cl. 73—864.85 **20 Claims**



1. A system for signalling the injection of a sample in a chromatograph having an injector port for receiving a fluid sample and a carrier fluid path, said system comprising:

differential pressure transducer means having first and second fluid inlets for generating a signal representative of the differential pressure between said first and second fluid inlets, a first one of said first and second fluid inlets being adapted to be coupled to the carrier fluid path;

means having an inlet adapted to be coupled to the carrier fluid path and an outlet coupled to the other one of said first and second fluid inlets for time averaging the fluid pressure in the carrier fluid path; and

event marker means coupled to said transducer means and responsive to a signal representative of a differential pressure of a selected threshold magnitude caused by injection of a sample into the chromatograph injector port for generating a control signal specifying the beginning of a sample run in the associated chromatograph in response to the injection of a sample in the injector port.

4,702,116

PERMANENTLY NON-DUSTING PIGMENT AND DYE PREPARATIONS, METHOD FOR PRODUCING THEM, AND MEASURING DEVICE THEREFOR

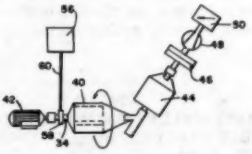
Manfred Gawol, Clausthal-Zellerfeld, and Gerhard Adrian, Goslar, both of Fed. Rep. of Germany, assignors to Dr. Hans Heubach GmbH & Co. KG, Langelsheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 763,437, Aug. 1, 1985. This application Jun. 12, 1986, Ser. No. 873,367

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1983, 3343743; Dec. 2, 1983, 3343742; Dec. 8, 1983, 3344464; Dec. 8, 1983, 3344463

Int. Cl.[4] G01N *5/00, 19/00, 33/00, 33/22*

U.S. Cl. 73—865.6 **9 Claims**



1. A device for measuring the dust production behavior of a pigment or dye preparation at conditions approximating actual practice, comprising a dust-generating vessel (2), which is rotated about an axis thereof by a drive motor (1) and includes built-in baffles which simulate conveyance phenomena;

a pump (5) for generating an air flow for carrying dust particles discharged from the dust-generating vessel (2);

a filter (4) having a defined porosity positioned downstream of the dust-generating vessel;

a coarse separator (3) for retaining coarser particles disposed between the filter (4) and the dust-generating vessel (2); and

an air lock, positioned downstream of said filter, having an air flow meter (6) which measures the air flow, where the air flow is discharged.

4,702,117

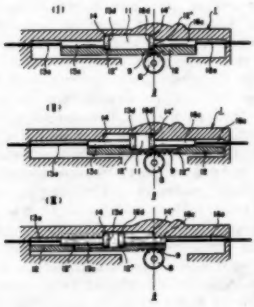
LOCK ACTUATOR FOR A PAIR OF LOCKS

Sunsaku Tsutsumi, and Takurou Ozawa, both of Tokyo, Japan, assignors to Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1986, Ser. No. 846,157

Int. Cl.[4] E05B *53/00*

U.S. Cl. 74—89.17 **5 Claims**



1. Lock actuator comprising:

a container housing;

a drive motor of reversible type and mounted in the container housing;

a remote ontrol switching unit for operation control of the said drive motor;

an operation control slide mounted in the container housing and translatable in a reciprocatable manner;

a first operation-transmitting wire cable leading from said slide to one of a pair of locks;

a second operation-transmitting wire cable leading from said slide to another of said pair of locks;

inner, motion-receiving enlarged heads of each of said operation-transmitting wire cables being arranged such that said enlarged heads face one another;

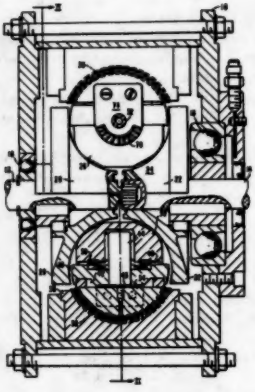
an at least two stage, reversible reduction gearing arranged between said drive motor and said operation control slide, the latter having three operating positions, one of which is offset relative to a neutral position for pullingly actuating the first wire cable; a second one of which is said neutral position and a third one of which is offset oppositely from said one position for pullingly actuating the second wire cable.

4,702,118

HYDRAULICALLY CONTROLLED INFINITELY VARIABLE TRACTION ROLLER TRANSMISSION

Charles E. Kraus, Austin, Tex., assignor to Excelermatic Inc., Austin, Tex.

Filed Sep. 22, 1986, Ser. No. 909,882
Int. Cl.[4] F16H *15/08, 15/00*
U.S. Cl. 74—200 **7 Claims**



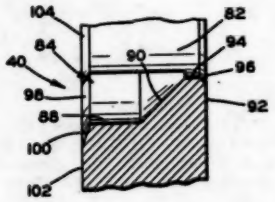
1. An infinitely variable traction roller transmission comprising: a housing; coaxial input and output shafts rotatably supported in said housing; two toric traction discs supported opposite each other, one by said input and the other by said output shaft, said toric discs having opposite toric traction surfaces defining therebetween a toric cavity of circular cross-section; at least two motion transmitting traction rollers arranged in said toric cavity in radial symmetry and in engagement with said toric discs for the transmission of motion therebetween, each of said traction rollers being rotatably supported in said housing by a support structure including a pivotal support member supported in said housing pivotally about an axis which is tangential to the center circle of said toric cavity and a roller support member rotatably supporting said traction roller and being supported on said pivotal support member by a hydrostatic bearing structure adapted to force said traction roller into firm engagement with said traction discs, the pivotal support member of each of said traction roller support structures having gear sections mounted thereon with the gear sections of the pivotal support members of angularly adjacent rollers being in meshing gear engagement for cooperating ratio changing pivotal movement of all the traction rollers in the transmission.

4,702,119

SHIFT MECHANISM EMPLOYING GEARS WITH BUILT-IN RAMPS

Douglas F. Edwards, Mt. Vernon, Ohio, assignor to The J. B. Foote Foundry Co., Fredericktown, Ohio

Continuation of Ser. No. 804,483, Dec. 4, 1985, abandoned. This application Mar. 9, 1987, Ser. No. 23,275
Int. Cl.[4] F16H *3/08*
U.S. Cl. 74—371 **4 Claims**



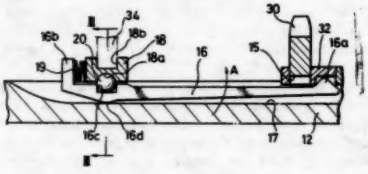
1. In a gear box having a gear shaft, a plurality of forward speed first gears, said first gears having two faces, said gears having bores forming circumferentially-spaced, inwardly-extending, arcuate surfaces rotatably receiving said shaft, a forward speed end gear rotatably mounted on said shaft adjacent the forward speed first gears, said forward speed end gear having two faces and a bore extending therebetween, a connecting member having a lug of generally triangular shape movable along said shaft for individually connecting said gears to said shaft for causing said gears to rotate individually with said shaft, said first gears having circumferentially-spaced recesses around said shaft to receive said lug, a neutral collar rotatably mounted on said shaft adjacent an end one of said plurality of first gears, said collar having two faces, said end gear being adjacent the other end one of said plurality of first gears, and a sprocket on said shaft adjacent said neutral collar on the side opposite said plurality of said first gears, said sprocket having two faces and a bore through which said gear shaft extends, the improvement comprising said forward speed end gear bore having a plurality of circumferentially-spaced recesses extending completely between the faces thereof to receive said lug, said sprocket bore having a plurality of circumferentially-spaced recesses extending completely between the faces thereof to receive said lug, said first gears having ramps in the recesses thereof, all of said ramps facing in only one common direction toward said neutral collar, the ramps of each of said first gears extending angularly substantially from the bottoms of the recesses toward only one common faces of the first gears away from said neutral collar, said ramps terminating in flat, arcuate edges having a width from ten to twenty-five percent of the thickness of the associated first gear, said flat, arcuate edges and said inwardly-extending arcuate surfaces forming continuous annular surfaces around the entire circumference of said gear shaft, and said flat, arcuate edges and said inwardly-extending, arcuate surfaces having common annular beveled surfaces at the common gear faces.

4,702,120

KEY-SHIFT TRANSMISSION

Hideaki Okada, Takarazuka, and Koji Irikura, Nishinomiya, both of Japan, assignors to Kanzaki Kokyukoki Mfg. Co., Ltd., Amagasaki, Japan

Filed Dec. 10, 1986, Ser. No. 940,247
Claims priority, application Japan, Jan. 10, 1986, 61-1720[U]
Int. Cl.[4] F16H *3/08*
U.S. Cl. 74—371 3 Claims



1. A key-shift transmission which comprises: a first shaft having thereon co-rotatable first gears; a second shaft arranged in parallel with said first shaft and having thereon freely rotatable second gears, said second gears being meshed with said first gears, respectively, so as to provide a plurality of speed-change trains of different gear ratios between said first and second shafts; shift keys slidably disposed within elongated axial grooves in the outer surface of said second shaft, each of said shift keys including a free end having a gear-engaging lug selectively projected outwardly of said groove into a recess in the inner circumference of each of said second gears so as to couple said each second gear to said second shaft; and a shift collar slidably mounted on said second shaft for shifting said shift keys axially of said second shaft, the key-shift transmission further comprising:

engaging means disposed between the inner circumference of said shift collar and base end portions of said shift keys for engaging said shift keys non-slidably with said shift collar while permitting a rotation of each of said shift keys along a direction such that said gear-engaging lug thereof is moved radially of said second shaft; and

compression spring means disposed between an axial end surface of said shift collar and projections on base ends of said shift keys for biasing said shift keys so as to project said gear-engaging lugs outwardly of said grooves, each of said projections being formed integrally with each of said shift keys and extending radially outwardly of said second shaft.

4,702,121

MULTIPLE SPEED DRIVING WHEEL FOR PEDAL POWERED VEHICLES

Dirck T. Hartmann, 4121 Morningstar Dr., Huntington Beach, Calif. 92649

Filed Jul. 10, 1986, Ser. No. 883,953
Int. Cl.[4] F16H *3/08*
U.S. Cl. 74—375 7 Claims

1. An improved multiple speed driving wheel for a pedal powered vehicle including a frame, said wheel comprising:

a central hub;

a pedal drive shaft on the axis of said hub and mounted in bearings for concentric rotation with said hub;

a vehicle frame interface fitting on each side of said hub;

a pedal crank arm fixed on each end of said pedal drive shaft for rotation outboard of said vehicle interface fitting, and including a cylindrical extension;

a pair of ball bearings having their inner races seated on the cylindrical extensions of said pedal crank arms, respectively, and their outer races seated inside said vehicle frame interface fittings, respectively;

a gear case located within said central hub and fixed to one of said vehicle interface fittings;

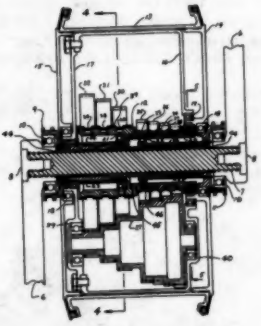
a drive gear carrier fixed on said pedal drive shaft for rotation therewith;

multiple drive gears rotatably mounted on said drive gear carrier;

drive gear locking means located outside the circumference of said pedal drive shaft, operative for selectively locking any one of said multiple drive gears to said drive gear carrier;

a driven gear carrier mounted for concentric rotation about said pedal drive shaft;

multiple driven gears rotatably mounted on said driven gear carrier;



driven gear locking means located outside the circumference of said pedal drive shaft, operative for selectively locking any one of said multiple driven gears to said driven gear carrier; multiple idler shafts rotatably mounted in said gear case, positioned parallel to and equally spaced around said pedal drive shaft;

gears fixed on each of said multiple idler shafts in mesh with each of said multiple drive gears and each of said multiple driven gears; and

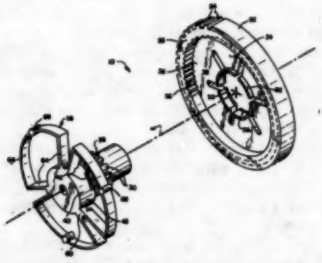
free-wheel ratchet means coupling said driven gear carrier with said hub for driving said wheel.

4,702,122

BI-DIRECTIONAL ADVANCE GEAR HAVING A TORQUE LIMITING CLUTCH

Matthew D. Richard, Franklin, Tenn., assignor to The Scott & Fetzer Company, Westlake, Ohio

Filed Sep. 2, 1986, Ser. No. 903,019
Int. Cl.[4] F16H *1/02;* F16D *7/02*
U.S. Cl. 74—412 TA 6 Claims



1. A bi-directional advance gear having a torque limiting radial friction clutch comprising an annular member having an inner and outer periphery and having gear teeth defined by its outer periphery and radially inwardly project teeth on its inner periphery, a flat web substantially closing one face of said

annular member to provide a shallow recess bounded by said projecting teeth and defining an opening concentric to said annular member, an inner member having a hub portion rotatedly mounted in said opening, a pinion gear portion axially projecting in one direction from said hub portion and a plurality of rosette-shaped springs radially extending from said hub and being contained in said recess, each said spring having a pair of radially extending leg portions joined by an arcuate portion, each arcuate portion having a lobe biased into engagement with said inwardly projecting teeth.

4,702,123

APPARATUS FOR DRIVING ROD FOR ROTATION

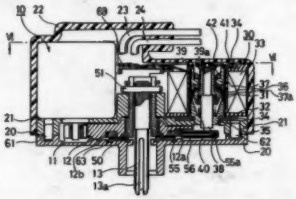
Kouji Hirao, Chiryu; Kazutaka Kuwana, Toyota, and Ken Asami, Nagoya, all of Japan, assignors to Aisin Seiki Kabushikikaisha and Toyota Jidosha Kabushikikaisha, both of Aichi, Japan

Filed May 9, 1985, Ser. No. 732,209

Claims priority, application Japan, May 9, 1984, 59-67283[U]; Apr. 19, 1985, 60-58385[U]

Int. Cl.[4] F16D *71/04*; F16F *9/18, 9/34*

U.S. Cl. 74—526 **18 Claims**



1. An apparatus for driving rod for rotation comprising:

a support member;

a d.c. motor having a rotary shaft carried by the support member;

a solenoid assembly carried by the support member and including a fixed core member, a plunger member, a spring member for urging the plunger member and an electrical coil which surrounds the fixed core member, the arrangement being such that the plunger member is driven to a first position against the resilience of the spring member when the electrical coil is energized and the plunger member is located at a second position which is spaced from the first position when the electrical coil is deenergized;

output shaft means rotatably mounted in the support member;

reduction gearing means interposed between the rotary shaft of the motor as an input shaft thereof and the output shaft means as an output rotating shaft thereof for providing a speed reduction of rotation of the d.c. motor before it is transmitted to the output shaft means;

a rotatable member rotatably mounted on one of the rotating shafts of the reduction gearing and including projection means which abuts the plunger member in said first position and which does not abut against the plunger member in the said second position;

lost motion coupling means for coupling the rotatable member to the rotating shaft in a manner to permit a rotation of the rotatable member within a given small angel while preventing a rotation of the rotatable member beyond the given angle;

a first stop member for preventing a rotation of the rotating shaft in a first direction at an angle of rotation where the projection means has rotated through the given angle beyond the position of the plunger member, and a second stop member for preventing a rotation of the rotating shaft in a second direction which is opposite from the first direction at an angle of rotation where the projection means has rotated through the given angle beyond the position of the plunger;

wherein said small angle is represented by α, an angle subtended with respect to the center of rotation of the projection means by a first point on the projection means where it abuts against the plunger member in its first position which is assumed as a result of its rotation in the first direction and a second point on the projection means where it abuts against the plunger member at its first position which is assumed as a result of rotation in the second direction by β, and an angle subtended by a pair of points on the plunger member which correspond to the first and the second point with respect to the center of rotation of the projection means by γ, α is substantially equal to $(\beta+\gamma/2)$; and

wherein said reduction gearing means comprises a small gear fixedly mounted on the rotary shaft of the d.c. motor and a larger gear fixedly mounted on the output shaft means and meshing with the small gear, the larger gear being formed in its lower surface with an annular groove in which the rotatable member is rotatably mounted, and in which the support member comprises a base located above the small and the larger gear and carrying the d.c. motor and the solenoid assembly thereon and also rotatably carrying the output shaft means and having an opening through which the plunger member extends, the lost motion coupling means comprising a fan-shaped groove formed in the larger gear so as to be continuous with the annular groove, the projection means on the rotatable member engaging the fan-shaped groove which permits the projection means to rotate therein through the given small angle.

4,702,124

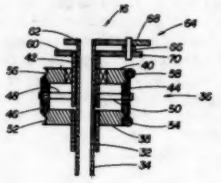
POWER TRANSMISSION DEVICE

John K. Schleicher, Borden, Ind., assignor to Accuratio Systems, Inc., Jeffersonville, Ind.

Filed May 30, 1986, Ser. No. 868,717

Int. Cl.[4] F16H *37/06*

U.S. Cl. 74—675 **14 Claims**



1. A power transmission device comprising:

a first output shaft;

a second output shaft coaxial with the first output shaft;

a first spur bevel gear concentrically located with the first output shaft and affixed to the first output shaft for rotation therewith;

a spur shaft concentrically located over the second output shaft and journal mounted thereto for independent rotation;

a second spur bevel gear coaxially located with and spaced from the first spur bevel gear, the second spur bevel gear also being concentrically located with the spur shaft and journal mounted thereon for rotation independently of the spur shaft;

at least one spur bevel pinion located in the space between the first and second spur bevel gears and in meshing engagement with both the first and second spur bevel gear;

means structually connecting the at laest one spur bevel pinion to the spur shaft;

means for selectively rotating the first spur bevel gear and the second spur bevel gear, and,

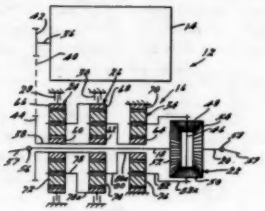
transfer means for drivingly interconnecting the spur shaft and the second output shaft.

4,702,125

HIGH REDUCTION TRANSAXLE FOR ELECTRIC VEHICLE

Ilmars Kalns, Plymouth, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 28, 1985, Ser. No. 695,767
Int. Cl.[4] F16H *37/08*
U.S. Cl. 74—695 **6 Claims**



1. In a drivetrain assembly including a prime mover having an output shaft and a transmission operative to provide at least first and second speed ratios between input and output drives via first and second planetary gear sets respectively including first and second sun gears, first and second ring gears, and first and second sets of planet gears in continuous mesh with their associated sun and ring gears and respectively carried by first and second planet carriers; the improvement comprising:

drive means including the input drive continuously interconnecting the prime mover output shaft with the first and second sun gears and driving the first and second sun gears at the same speed, a first drive continuously interconnecting the second carrier with the first ring gear, and a second drive continuously interconnecting the first carrier with the output drive; and

first and second brake means respectively operative when engaged to prevent rotation of the first and second ring gears, the transmission operative to provide the first speed ratio when said first brake is engaged and said second brake is disengaged, and said transmission operative to provide the second speed ratio when said first brake is disengaged and said second brake is engaged;

a gear differential driving first and second driveshafts; and

a fixed speed reduction gear set interposed between the first planetary carrier and the differential and including a three element planetary gear set having sun, ring and planet gear elements, one of said elements being fixed directly to the first planet carrier by an intermediate drive, a second element, fixed to ground, and the third element being connected directly to the said gear differential.

4,702,126

AXIAL GEAR TRAIN HAVING SYNCLINE FACE CYCLOID GEARING

Takeichi Nakamura, 6-12, Hojo 6-chome, Daitoshi, Osaka, Japan 574

Continuation-in-part of Ser. No. 431,089, Sep. 30, 1982, abandoned. This application Feb. 27, 1985, Ser. No. 706,298
Claims priority, application Japan, Sep. 30, 1981, 56-156366
Int. Cl.[4] F16H *1/02*
U.S. Cl. 74—800 **4 Claims**

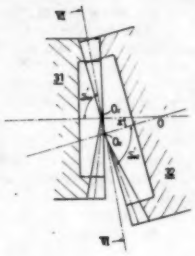
1. An axial gear train having syncline face cycloid gearing which comprises:

a first pair of opposed, spaced apart face gears supported on respective shafts having a common axis;

an inclined shaft fixed to the end of one of the shafts, the inclined shaft having an axis passing a point between the two face gears, and inclined at a predetermined angle to the common axis;

a face cycloid gear rotatably supported on the inclined shaft and having a second pair of face gears at opposite end faces thereof which engage the first pair of face gears, with the pitch cone vertices of the second pair of face gears not coinciding;

the first face gears having a different number of gear teeth than the second face gears and the first and second pairs of face gears having the same modules;



each tooth of the face gears having the same angle toward the center of tooth thickness, and the generators of their pitch cones being in agreement at the maximal osculated point and their tooth shape being in agreement in the tooth traces; and

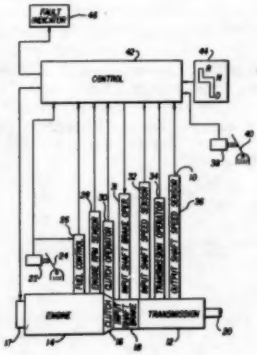
at least one of the face gears having all the tooth faces of each gear tooth thereof converging at a common converged point, and the converged point of the tooth faces displaced from the pitch cone vertex thereof, each converged point being displaced from the pitch cone vertex by an equal amount.

4,702,127

METHOD FOR CONTROLLING AMT SYSTEM INCLUDING GEAR NEUTRAL SENSOR SIGNAL FAULT DETECTION AND TOLERANCE

William F. Cote, Farmington Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Apr. 18, 1986, Ser. No. 853,816
Int. Cl.[4] B60K *41/04*
U.S. Cl. 74—866 **6 Claims**



1. A method for controlling an automatic mechanical transmission system (**10**) for devices having a throttle-controlled engine (**14**), a transmission having a plurality of gear ratio

combinations selectively engageable between a transmission input shaft and a transmission output shaft, said transmission input shaft being operatively connected to said engine by means of a selectably engageable and disengageable coupling providing driving connection between said engine and said input shaft, said automatic mechanical transmission system comprising an information processing unit having means for receiving a plurality of input signals including (1) an input signal indicative of at least one of currently engaged, last engaged and about to be engaged gear ratio of the transmission; (2) an input signal indicative of the rotational speed of the transmission input shaft; (3) an input signal indicative of the rotational speed of the transmission output shaft, and (4) an input signal indicative of the gear neutral and not gear neutral conditions of said transmission, said gear neutral and not gear neutral condition input signal having a first value indicating the presence of a gear neutral condition and a second value indicating the presence of a not gear neutral condition, said processing unit including means for processing said input signals in accordance with a program and for generating output signals whereby said transmission system is operated in accordance with said program, and means associated with said transmission system effective to actuate said transmission system to effect engagement of said gear ratio combinations in response to said output signals from said processing unit, the method characterized by:

sensing the presence or absence of faulty input signals indicative of the presence of a transmission gear neutral condition and not gear neutral condition; and

if said input signal indicative of transmission gear neutral condition and not gear neutral condition is determined to be faulty, ignoring said input signal indicative of gear neutral condition and not gear neutral neutral conditions and sensing a gear neutral condition if:

$$IS-[GR*OS]\neq\emptyset$$

and sensing a not gear neutral condition if:

$$IS-[GR*OS]=\emptyset$$

where:

IS=a signal indicative of input shaft rotational speed;

OS=a signal indicative of output shaft rotational speed; and

GR=a signal indicative of: the currently engaged gear ratio if a transmission shift is not being executed, the last engaged gear ratio if the transmission is being commanded to shift from engagement into neutral and the about to be engaged gear ratio if the transmission is being commanded to shift from neutral into engagement.

4,702,128

RATIO CONTROL SYSTEM FOR CONTINUOUSLY VARIABLE TRANSMISSION

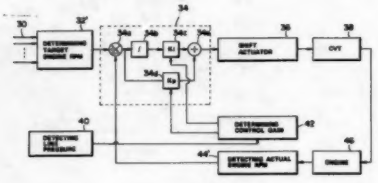
Katsunori Oshiage, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed May 10, 1985, Ser. No. 732,694

Claims priority, application Japan, May 14, 1984, 59-94440

Int. Cl.⁴ B60K *41/16*

U.S. Cl. 74—866 **12 Claims**



1. A ratio control system for a continuously variable transmission having a hydraulic shifting mechanism which produces a change in transmission reduction ratio responsive to a change in line hydraulic fluid pressure which varies with reduction ratio, comprising:

means for generating a line hydraulic pressure level indicative signal which indicates the level of line hydraulic fluid pressure and varies with the level of line hydraulic fluid pressure;

means responsive to said line hydraulic fluid pressure level indicative signal for determining a control gain which varies with said line hydraulic fluid pressure level indicative signal and generating a control gain indicative signal indicating the determined control gain; and

feedback control means for producing a control factor responsive to said control gain indicative signal and a ratio change command, wherein said hydraulic shifting mechanism is controlled in response to said control factor.

4,702,129

GRIPPER FOR CONTAINER CAPS

Louis Allen, 166 E. 61st St., New York, N.Y. 10021

Filed Dec. 2, 1985, Ser. No. 804,048

Int. Cl.⁴ B67B *7/44*

U.S. Cl. 81—3.09 **8 Claims**

1. A gripper for facilitating the removal and tightening of container caps comprising:

a generally solid spherical body of resilient material adapted for palm-fitting, hand-held engagement,

said body defining at least one recess in an outer surface of the body, said recess extending radially within the body,

means for applying a radial inwardly directed palm and finger generated pressure on the outer surface of the body, said pressure being effective for conforming the recess to the cap and for providing frictional engagement therewith, and

means for applying a turning force to the spherical body to develop a mechanical advantage rotational torque upon the cap.

4,702,130

BOTTLE CAP REMOVER

Bobby V. Davis, P.O. Box 2057 Rathburn Rd., Wooster, Ohio 44691

Filed Jun. 2, 1986, Ser. No. 869,247

Int. Cl.⁴ B67B *7/16*

U.S. Cl. 81—3.56 **2 Claims**

1. Bottle opener consruction for removing and retaining a crown seal cap having a crown including a flat top crown surface and a downturned crimped flange mounted on a bottle top having a cap engaging ring including a first elongated straight lever means having a jaw end and a hand engaging end, a second curved elongated lever means having a jaw end and hand engaging end, said first lever and second lever being pivotally attached to each other intermediate their respective jaw ends and handle ends, said levers being pivotal between open and closed positions, said first lever means including a flat bottle cap engaging member extending at right angles from said jaw end and adapted to engage the flat top crown surface of the crown sealed bottle cap, said second lever means includ-

ing an elongated tapered finger portion adapted to be inserted between the downturned flange of the crown seal bottle cap and the annular ring of a bottle upon which the cap is sealed, said levers being constructed and arranged so that pivoting of a handle portion toward each other moves the finger portion of the second lever jaw toward the flat cap engaging member fo

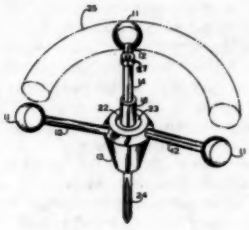
the first lever jaw to a position where said finger portion is adjacent said flat cap engaging member to effect removal of the bottle cap from the bottle without distorting the flat top crown surface of the bottle cap and to retain the removed bottle cap between the finger portion and the adjacent flat cap engaging member.

4,702,131

HAND DRIVEN PRECISION TAPPING SYSTEM

Harold Snow, Holiday Dr., Shaftsbury, Vt. 05262

Filed Jun. 24, 1985, Ser. No. 747,771
Int. Cl.[4] B23B *43/00*; B23G *5/06*
U.S. Cl. 81—177.5 **4 Claims**



1. A hand-driven tap wrench comprising:

a body having essentially a flat top and base, said base having therein a chamber for receiving a tool securing means that is adapted to hold a cutting tool, said top having a countersunk threaded hole for receiving a threaded cylindrical shaft of smaller diameter than the countersink so as to create a groove between said countersink and the threadably inserted shaft;

handling means rigidly secured to the body and elevated relative to the point of securement, said means used to hand drive the body in a rotational rotation about said cylindrical thread shaft; and

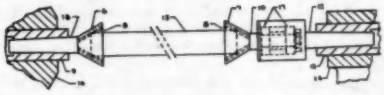
guide means for allowing the body to be advanced towards a work piece, being retained in proper alignment by a tool holder of a rotating machine, and to be thereafter retracted from the work piece and removably secured to said holder, said guide means comprising said cylindrical shaft one end of which is threadably attached to the body and the other end is provided with a flange, a slidable, cylindrical bushing having a top and a base flange bearing an O-ring about the base flange outer surface, said bushing being mounted on said shaft cylindrical so that its base flange may be press-fitted into said groove and prevented from sliding off said shaft by the shaft flange, whereby when said bushing is clamped in the tool holder of a rotating machine, the body may be slidably advanced towards a work piece until the top of said bushing contacts the shaft flange and, upon retraction from the work piece, the body bearing the shaft in its top may be guided towards said holder until the bushing's base flange is press-fitted into the body's groove and the body is thereafter secured to the bushing by the frictional restraint of said O-ring.

4,702,132

CENTERING FIXTURE FOR WOOD TURNING LATHE

Hillman R. Grosse, 1226 Emilie St., Green Bay, Wis. 54301

Filed Mar. 25, 1986, Ser. No. 845,824
Int. Cl.[4] B23B *33/00*
U.S. Cl. 82—40 R **1 Claim**



1. A conical device used for centering wood on a wood turning lathe, composed with;

a. four grooves, equally spaced, milled on the interior of the cone to accept the corners of a reasonably square piece of wood,

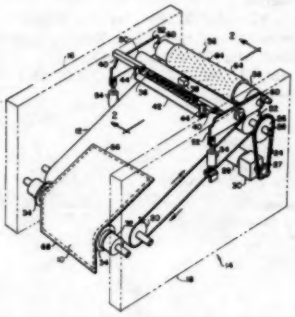
b. an interior to be tapered with a thirty degree taper.

4,702,133

METHOD OF PRODUCING MAT WITH VALVES THEREIN

Aage Lang, Kolind, Denmark, assignor to Clean-Tex A/S, Morke, Denmark

Division of Ser. No. 695,683, Jan. 28, 1985, Pat. No. 4,589,316.
This application Sep. 11, 1985, Ser. No. 774,711
Int. Cl.[4] B26F *1/10*
U.S. Cl. 83—30 **4 Claims**



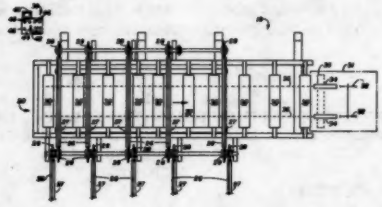
1. The method of providing valve-like perforations in the rubber-like backing material of a nap mat or carpet having a center portion of pile yarn and a border portion of rubber-like material comprising the steps of: placing the mat to be perforated face down on an endless conveyor, sensing the leading edge of the mat, pivoting a perforating roll into contact with the back of the mat after the leading edge thereof has been sensed, perforating the back of the mat and pivoting the perforating roll away from the back of the mat after the trailing edge thereof has been sensed by a sensing device.

4,702,134

EDGING APPARATUS

Andrew J. Corley, III, Lookout Mountain, Tenn., assignor to Corley Manufacturing Company, Chattanooga, Tenn.

Filed Apr. 10, 1986, Ser. No. 850,225
Int. Cl.[4] B27B 5/04
U.S. Cl. 83—71 22 Claims



1. An edging apparatus controlled by an operator and having saws for edging a wood board that is priced by the whole board foot in accordance with a rounding rule under which fractions of a whole board foot are rounded up or down, comprising:

positioning apparatus for positioning and holding the saws;

selection means controlled by an operator for selecting initial cut positions for the saws;

input means for generating input data including board length and thickness parameters and the initial cut positions;

compute means responsive to the input data for computing best cut positions for the saws based on the rounding rule, said best cut positions being computed to produce an edged board whose measurement exceeds a whole board foot measurement by a desired fraction of a board foot; and

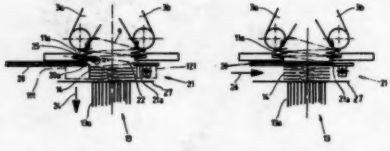
output means for outputting the computed best cut position so that the saws may be positioned in accordance therewith.

4,702,135

APPARATUS FOR ZIG-ZAG FOLDING OF PAPER WEBS AND THE LIKE

Hans D. Kwasnitza, Neuffen, Fed. Rep. of Germany, assignor to Womako Maschinenkonstruktionen GmbH, Nürtingen, Fed. Rep. of Germany

Filed Jul. 9, 1986, Ser. No. 883,625
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 3525640; Mar. 29, 1986, 3610640
Int. Cl.[4] B65H 45/28, 45/20; B26D 5/20
U.S. Cl. 83—278 5 Claims



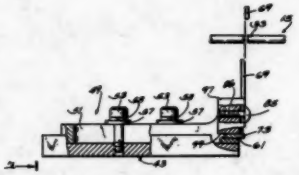
1. Apparatus for subdividing a web having a series of panels which are stacked on each other in zig-zag formation and wherein the neighboring panels are connected to each other by transversely extending fold lines, comprising a pair of spiral conveyors disposed at opposite sides of the zig-zag formation and arranged to guide and advance alternate fold lines of the zig-zag formation; a separating device arranged to move between selected neighboring panels of the zig-zag formation from one of said sides; means for selectively starting and arresting the spiral conveyor at said one side of the zig-zag formation; and means for severing the web along the fold line which connects the selected panels to each other while the spiral conveyor at said one side of the zig-zag formation is arrested by said means for starting and arresting and the spiral conveyor at the other side of the zig-zag formation continues to be driven, said severing means comprising a knife disposed at the other side of the zig-zag formation and means for moving said knife relative to the zig-zag formation.

4,702,136

TOOL HOLDER FOR WIRE CUTTER

John D. Butler, New Berlin, Wis., assignor to Mechtrix Corporation, Wauwatosa, Wis.

Filed May 22, 1986, Ser. No. 865,686
Int. Cl.[4] B21F 11/00
U.S. Cl. 83—694 5 Claims



2. Apparatus for cutting selected lengths of insulated electrical conductors from a supply thereof comprising:

(a) a base formed with a longitudinal groove extending substantially parallel to the insulated electrical conductor to be cut;

(b) an imperforate cutting blade having two opposed faces, two opposed longitudinal edges, and a shank edge;

(c) a blade holder mounted to the base and having a bar portion adapted to slide within the base groove and to be releasably fastened to the base at selected locations therealong, the blade holder being formed with a head having a pair of pedestals extending laterally from one end of the bar portion, the pedestals defining a slot for locating one face and the opposed longitudinal edges of the cutting blade such that the cutting blade second face forms the outer boundary of the insulated electrical conductor cutting apparatus;

(d) locating means mounted to the blade holder for locating the cutting blade shank edge; and

(e) clamp means for retaining the cutting blade to the blade holder, the clamp means comprising a fastener received in each pedestal and having an enlarged head for overlapping the cutting blade to thereby retain the cutting blade in the blade holder slot.

4,702,137

AUTOMATIC BAND-SAW SYSTEM

Delma Davidson, Batesville, and Thomas R. Waechter, Oldenburg, both of Ind., assignors to Pallet Master, Inc., Fridley, Minn.

Filed Aug. 20, 1985, Ser. No. 767,623
Int. Cl.[4] B27B 29/08
U.S. Cl. 83—718 16 Claims

1. A band-saw-cutting system, comprising:

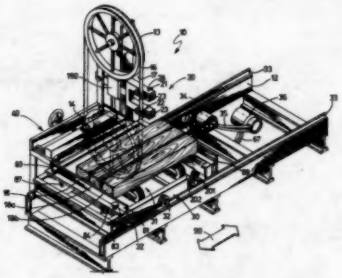
means for supporting a flexible, band-saw blade;

means for driving said saw blade in a cutting plane;

means for supporting and driving work to be cut by said saw blade into a plurality of pieces, said supporting and driving means including a work carrier for carrying said work and means for reciprocating said work carrier and said work carried thereby in a direction parallel to said cutting plane of said blade from a home position to a forward position for cutting said work, and to return said work from said forward position back to said home positions;

mechanical blade-moving means, including linkage means

coupled to said saw blade support means, for moving said flexible saw blade into and out of said cutting plane, said saw blade support means positioning said saw blade in said cutting plane for cutting said work as said supporting and driving means moves said work from said home position to said forward position and being movable by said linkage out of said cutting plane as said supporting and driving



means returns said work from said forward position to said home position so that said work will not contact said saw blade as it moves from said forward position to said home position; and

means mounted on said work carrier for actuating said linkage means to move said saw blade into and out of said cutting plane during the reciprocation of said work carrier.

4,702,138

CUTTING APPARATUS FOR CERAMIC GREEN SHAPED BODIES

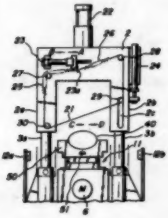
Isao Hattori, Nagoya, and Akio Enomoto, Chita, both of Japan, assignors to NGK Insulators, Ltd., Aichi, Japan

Filed Mar. 20, 1986, Ser. No. 841,613

Claims priority, application Japan, Apr. 13, 1985, 60-77537

Int. Cl.[4] B26D *1/547, 1/60*

U.S. Cl. 83—785 **3 Claims**



1. A cutting apparatus for ceramic green shaped bodies comprising:

a cutting frame having a pair of arm portions arranged side by side in the widthwise direction of the ceramic green shaped body, each arm having a front end adjacent the ceramic green shaped body and a rear end opposite said front end, a middle area being located between said front and rear ends;

two rolls attached to the two arm portions, a first one of said rolls being attached to the front end of one of the two arm portions and a second one of said rolls being movably attached to the middle area of the other of the two arm portions;

a cutting fine wire having a diameter of 0.1–0.05 mm and directly extending about the two arm portions through the roll arranged in each of the arm portions, both free ends of said wire being joined to two springs connected at opposite ends with each other;

means for moving the arm portions in a cutting direction of the ceramic green shaped body to a cutting position, and cutting the fine wire extended about the rolls into the ceramic green shaped body;

means for reciprocally moving the second roll from the middle area to the front end of the other arm portion after the means for moving the arm portions moves the arm portions to the cutting position; and

means for reciprocally moving the cutting fine wire where at least one reciprocating motion of the cutting fine wire extended about the rolls is carried out during the moving of the cutting fine wire across the ceramic green shaped body while moving the arm portions in the cutting direction of the ceramic green shaped body.

4,702,139

CHAIN WITH CUTTING TEETH

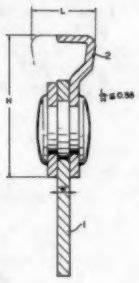
Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Filed Apr. 4, 1986, Ser. No. 848,856

Claims priority, application Japan, Apr. 24, 1985, 60-61521[U]

Int. Cl.[4] B27B *33/14*

U.S. Cl. 83—830 **6 Claims**



1. A chain with cutting teeth wherein a width W of a gauge of a drive link is less than 0.050 in. and a ratio R of set L to height H of a cutter link is less than 0.55.

4,702,140

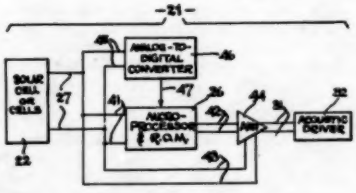
SOLAR-POWERED MUSICAL ORNAMENTS AND NOVELTIES

Adolph E. Goldfarb, 1432 S. East Wind Cir., Westlake Village, Calif. 91361

Continuation-in-part of Ser. No. 565,987, Dec. 27, 1983, abandoned. This application Dec. 27, 1984, Ser. No. 686,664

Int. Cl.[4] G10H *5/04, 7/00*

U.S. Cl. 84—1.01 **13 Claims**



1. A working module for an inexpensive ornament or a

give-away novelty or the like which emits tunes or other sounds; said module comprising:

a solid-state digital electronic circuit, preprogrammed at manufacture to generate exclusively a series of electronic oscillations, preestablished at manufacture, corresponding directly to a tune or other series of sounds preestablished at manufacture;

a small speaker mounted to the chassis and connected to receive exclusively the preprogrammed electronic oscillations from the circuit and to emit the corresponding preestablished tune or other sounds for the exclusively unilateral entertainment or information of nearby people;

said preprogrammed oscillations being directed exclusively to the speaker, through amplification and control circuitry; and

a solar cell mounted to the chassis and connected to power the circuit when exposed to light, so as to provide unattended operation essentially indefinitely;

the circuit being further preprogrammed to emit the particular tune or particular other sounds only when the dynamic behavior of light incident on the solar cell as a function of time satisfies corresponding particular criteria; and

the circuit being further preprogrammed to suppress emission of the particular tune or other sounds even when sufficient light is available to power the circuit and speaker, if the dynamic behavior of incident light does not satisfy said criteria.

4,702,141

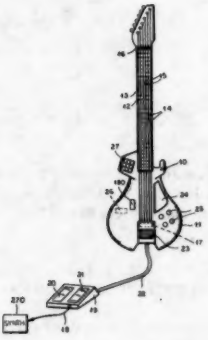
GUITAR CONTROLLER FOR A MUSIC SYNTHESIZER

Carmine Bonanno, 820 Rushmore Ave., New York, N.Y. 10543

Continuation-in-part of Ser. No. 669,666, Nov. 9, 1984, Pat. No. 4,630,520. This application Mar. 13, 1986, Ser. No. 839,711

Int. Cl.[4] G10H *3/18*

U.S. Cl. 84—1.16 **8 Claims**



1. A method of detecting note selection in a guiitar having a plurality of frets spaced apart along a neck of said guitar and a plurality of guitar strings extending along said neck over said frets, said method comprising the steps of:

(a) multiplexing a single current source to all of said strings in succession at one end of said strings and simultaneously multiplexing a current drain to another end of said strings whereby said source can pass a current determined by the current output thereof through aid strings in succession, thereby generating voltage gradients in succession across said strings;

(b) measuring a voltage forming part of sasid gradient of each string upon the depression thereof into contact with a respective fret without drawing significant electric current through the point of contact or altering substantially said gradient, thereby determining a free tone-generating length of the respective string;

(c) controlling a music synthesizer in response to the measured voltage to generate a tone corresonding to said free tone-generating length of the string depressed into contact with a fret; and

(d) measuring intermittently a voltage from each string and calibrating the respective voltage gradients of said string by adjusting the output of said source on a string-by-string basis in response to the voltage measured from each string independently of the voltage measured as part of said gradient.

4,702,142

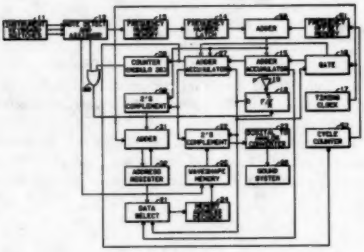
FUNDAMENTAL FREQUENCY VARIATION FOR A MUSICAL TONE GENERATOR USING STORED WAVEFORMS

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instruments Mfg. Co, Ltd, Hamamatsu, Japan

Filed Apr. 17, 1986, Ser. No. 853,112

Int. Cl.[4] G10H *1/06, 7/00*

U.S. Cl. 84—1.01 **15 Claims**



14. In combination with a musical instrument having an array of keyswitches, apparatus for producing a musical tone having temporal variations of a fundamental frequency comprising;

a coefficient memory means for storing a set of harmonic coefficient values,

a frequency number generator means wherein a frequency number is generated corresponding to an actuated keyswitch in said array of keyswitches,

a frequency number scaling means wherein said frequency number is varied in magnitude in response to a time variant scale signal to produce a scaled frequency number,

a scaling generating means for generating said time variant scale signal,

a computing means responsive to said set of harmonic coefficient values and said scaled frequency number for computing a sequence of data words at a regular time intervals, and

a means for producing musical waveshapes from said sequence of data words thereby producing said musical tone having temporal variations of a fundamental frequency.

4,702,143

DRUMSTICK

Irwin H. Brochstein, Houston, Tex., assignor to Pro-Mark Corporation, Houston, Tex.

Filed Feb. 26, 1986, Ser. No. 833,114

Int. Cl.[4] G10D *13/02*

U.S. Cl. 84—422 S **6 Claims**

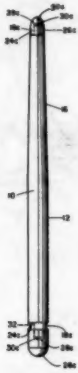
1. An improved drum stick for use with a percussion instrument, the improvement comprising:

(a) a knob means extending from one end of the drum stick, said knob means having a cylindrical diameter less than the cylindrical diameter of the drum stick;

(b) percussion means having an axial bore originating at a proximal end of said percussion means, said percussion

means being rounded and solid at a distal end, said knob means being inserted into said axial bore to frictionally engage said percussion means;

(c) an annular shelf at said end of the drum stick from which said knob means extends, the outside diameter of said



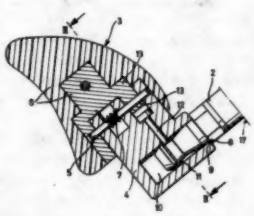
proximal end of said percussion means being substantially equal to the outside diameter of said annular shelf, said proximal end of said percussion means abutting said shelf, the diameter of said percussion means being greatest at said proximal end.

4,702,144

COCKING SLIDE FOR AUTOMATIC HAND FIREARMS

Ulrich Zedrosser, Steyr, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Jun. 9, 1986, Ser. No. 872,281
Claims priority, application Austria, Jun. 19, 1985, 1813/85
Int. Cl.[4] F41D *11/00*
U.S. Cl. 89—1.4 **8 Claims**



1. A cocking slide for automatic hand firearms, comprising

a housing of a firearm,

a handle projecting away from said housing, said handle including gripping means and guiding means,

an axle disposed in said handle and substantially parallel to said housing, said gripping means being limitedly slewable about said axle,

spring means disposed on said axle, said spring means biasing said gripping means away from said housing,

coupling means abutting said guiding means and forming a one-way coupling when said handle is moved away from said housing, and

blocking means supported in said guiding means, said blocking means engaging said coupling means and

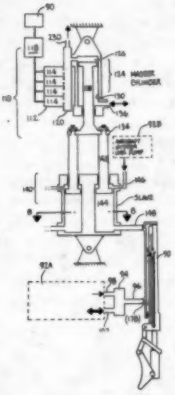
limiting the movement of said handle when said gripping means is slewed toward said housing.

4,702,145

STORES MAGAZINE AND LAUNCH SYSTEM

John T. Kannapell, Hermosa Beach; Haig Asdurian, Fullerton, and Robert F. Buttles, Torrance, all of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Filed Jun. 17, 1986, Ser. No. 875,422
Int. Cl.[4] F41F *3/06*; B64D *1/02*
U.S. Cl. 89—1.803 **24 Claims**



1. A stores handling system for an aircraft having a fuselage including a chamber for enclosing the stores handling system proximate an area openable through said fuselage through which stores may be loaded into and ejected from the aircraft, the handling system comprising

a magazine arranged substantially vertically within the chamber for storing and positioning ejectable stores and including flexible drive means having stores holding means spaced apart thereon for engaging and retaining stores against movement within the aircraft, and for lifting and/or lowering stores within the chamber; and

a launching mechanism for receiving stores individually from said magazine means, and including actuator means having stores positioner portions for engaging and controllably ejecting stores through the openable area of the fuselage of the aircraft.

4,702,146

GAS PRESSURE ADJUSTING DEVICE IN GAS-OPERATED AUTO-LOADING FIREARM

Kouhei Ikeda, Miwa; Kozo Iwata, Gifu, and Hisayoshi Masaki, Kawage, all of Japan, assignors to Howa Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 7, 1986, Ser. No. 827,351
Claims priority, application Japan, Feb. 14, 1985, 60-27129
Int. Cl.[4] F41D *5/08*
U.S. Cl. 89—193 **4 Claims**

1. A pressure adjusting valve assembly for a gas-operated auto-loading firearm having a gas operated mechanism which is actuated by gas pressure generated in a barrel of the firearm during firing thereof, the gas pressure being introduced into an actuating cylinder to drive a piston rearward therein which in turn actuates a breech bolt for facilitating the automatic operation of the firearm, said pressure adjusting valve assembly comprising:

a partition wall confronting the piston and defining a front end of the cylinder, said partition wall having a valve opening extending therethrough,

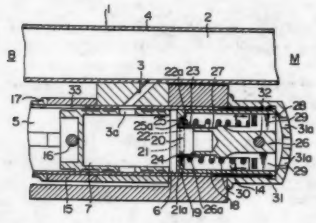
said valve opening comprising a first opening extending a predetermined distance through one end of said partition wall which confronts said piston, said first opening having a first relatively small diameter, and a second opening

open to and continuous with said first opening and extending a second predetermined distance through the other side of said partition wall, said second predetermined distance being greater than said first predetermined distance, said second opening having a relatively large diameter that is larger than said relatively small diameter of said first opening,

the portion of said partition wall surrounding said valve opening being a valve seat; and

a valve body seated on said valve seat, and spring means connected to said valve body for urging said valve body against said valve seat whereat said valve body closes said valve opening, said valve opening open to and comunicating with the atmosphere when said valve body is in an open position with respect to said valve opening,

said valve body having a rear end portion extending within said first opening and in sliding engagement with the portion of said partition wall surrounding said first opening, said rear end portion having a first pressure-receiving surface exposed at said one side of said partition wall, and a front end portion extending within said second opening and in sliding engagement with the portion of said partition wall surrounding said second opening, said front end portion having a second pressure receiving surface that faces said first opening,



the gas pressure introduced into the actuating cylinder acting on said first pressure receiving surface to slide said rear end portion of said valve seat over said first predetermined distance and out of said first opening when the gas pressure exceeds a predetermined amount which overcomes a force exerted by said spring means after which the gas pressure then acts on said first pressure receiving surface and said second pressure receiving surface to abruptly slide said front end portion of said valve seat out of said second opening to place said valve body in said open position to vent the gas pressure exceeding said predetermined amount to the atmosphere,

whereby when relatively low gas pressure that is less than said predetermined amount is introduced into the actuating cylinder during firing of a low-base load shell,said rear end portion is not slid out of said first opening and the relatively low gas pressure sufficiently drives the piston to actuate the breech bolt, and

when relatively high gas pressure that exceeds said predetermined amount is introduced into the actuating cylinder during firing of a high-base load shell, said valve body is abruptly moved to said open position to abruptly vent the gas pressure exceeding said predetermined amount to the atmosphere for preventing parts of the firearm that are moved by the gas pressure exceeding said predetermined amount from exerting an excessive impact force.

4,702,147

ENGINE WITH PNEUMATIC VALVE ACTUATION

Don E. Johnson, and D. Scott Johnson, both of 256 North Fraser Dr. West, Mesa, Ariz. 85203

Filed Aug. 2, 1985, Ser. No. 762,244
Int. Cl.[4] F01L *25/02*
U.S. Cl. 91—318 **7 Claims**

1. An engine comprising

a cylinder

a floating piston in said cylinder,

a first inlet port and a first exhaust port adjacent one end of said cylinder,

a second inlet port and a second exhaust port adjacent the opposite end of said cylinder,

a first inlet line connected to said first inlet port,

a second inlet line connected to said second inlet port,

a first exhaust line connected to said first exhaust port,

a second exhaust line connected to said second exhaust port,

a first valve unit connected to said first inlet line and said first exhaust line,

a second valve unit connected to said second inlet line and said second exhaust line,

a first pressure responsive valve member in said first valve unit movable to two positions in one of which it opens said first inlet line and closes said first exhaust line, and in the other of which it closes said first inlet line and opens said first exhaust line,

a second pressure responsive valve member in said second valve unit movable to two positions in one of which it opens said second exhaust line and closes said second inlet line, and in the other of which it closes said second exhaust line and opens said second inlet line,

a first fluid passage extending from said one end of said cylinder to said first and second valve units and connected such that fluid pressure in said first fluid passage will urge said first pressure responsive valve member to said one position thereof, and said second valve member to said one position thereof,

a second fluid passage extending from the opposite end of said cylinder to said first and second valve units, and connected such that fluid pressure in said second fluid passage will urge said first valve member to said other position thereof and will urge said second valve member to said other position thereof,

means for closing said second exhaust port as said piston approaches said opposite end of said cylinder for building up pressure in said second fluid passage for moving said first and second pressure responsive valve members to said other positions thereof,

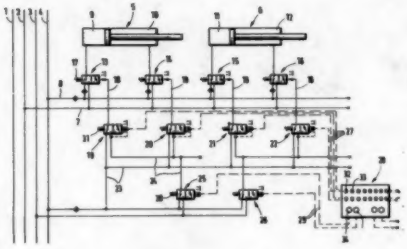
and means for closing said first exhaust port as said piston approaches said one end of said cylinder for building up pressure in said first fluid passage for moving said first and second pressure responsive valve members to said one position of each of said valve members.

4,702,148

CONTROL OF THE ACTUATION OF HYDRAULIC CONSUMERS

Willy Kussel, Werne; Michael Dettmers, Kamen, and Walter Weirich, Dortmund, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Lunen, Fed. Rep. of Germany

Filed Jun. 25, 1986, Ser. No. 878,154
Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530657
Int. Cl.[4] F15B *11/00*
U.S. Cl. 91—527 13 Claims



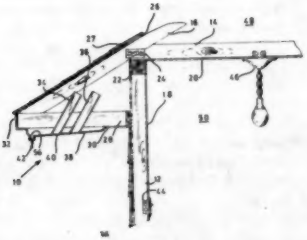
3. An arrangement for controlling the actuation of hydraulic consumers, the hydraulic consumers being connected to a hydraulic pressure line, the control arrangement comprising a respective hydraulic directional control valve associated with each of the hydraulic consumers, a respective electro-hydraulic pre-control valve associated with each of the hydraulic directional control valves, and electro-hydraulic directional control valve means associated with the pre-control valves, each of the hydraulic consumers being connected to the hydraulic pressure line via the associated hydraulic directional control valve, wherein each hydraulic directional control valve is actuated by a control line leading from the output side of the associated pre-control valve, and wherein the input sides of the pre-control valves are connected directly to a hydraulic return line and indirectly, via the electro-hydraulic directional control valve means, to the hydraulic return line or to a hydraulic control line.

4,702,149

PASSIVE DEHUMIDIFICATION OF ATTIC AND CRAWL SPACE OF BUILDINGS

William D. Speer, 319 Lisa La., Gallatin, Tenn. 37066

Filed Jan. 20, 1987, Ser. No. 4,889
Int. Cl.[4] F24F *7/02*
U.S. Cl. 98—37 14 Claims



1. A passive dehumidification vent for use in admitting air to the unheated space of a heated building to reduce the moisture content of such space with reduced air flow, which comprises:

at least one air flow tube having a first end for communication with such space and a further end for communication with the atmosphere exterior to such building, said tube adapted for penetration through an opening leading to such space, said tube fabricated of a high thermal conductivity material;

sealing means attached to said further end of said tube for sealing any space surrounding said tube when said tube is disposed within said opening;

collection means surrounding said tube to collect moisture condensed upon an exterior surface of said tube, said collection means preventing reintrainment of said moisture in air flowing through said tube; and

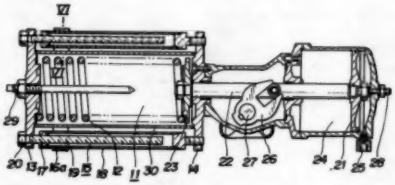
a drain connected to said collection means to convey condensed and collected moisture to a position exterior to such building.

4,702,150

SPRING-RETURN TYPE ACTUATOR

Shoichi Kaji, Yamanashi, Japan, assignor to Kitz Corporation, Tokyo, Japan

Filed Nov. 26, 1985, Ser. No. 802,224
Claims priority, application Japan, Jun. 21, 1985, 60-92969[U]; Jun. 21, 1985, 60-92970[U]
Int. Cl.[4] F01B *29/00, 31/00, 9/00*
U.S. Cl. 92—128 1 Claim



1. A spring-return type actuator comprising:

a cylinder having at least one port serving as inlet and outlet for a pressurized fluid;

a piston slidably positioned in said cylinder for reciprocating with respect to said cylinder;

a piston rod attached to said piston and slidably positioned within the actuator;

a drive shaft rotatably positioned within the actuator;

a movement conversion-transmission means operatively associated with both said piston rod and said drive shaft for converting the reciprocation of said piston rod into a rotary motion of said drive shaft;

a spring means comprising a spring box, a pair of opposite side walls each having a flange portion projecting outwardly from the periphery of said spring box, a spring holder attached to said piston rod and accommodated within said spring box, and a spring accommodated within said spring box and compressed between one side wall of said pair of opposite side walls and said spring holder;

a pair of stoppers attached respectively to a wall of said cylinder and to said one side wall of said spring means for defining the reciprocation of said piston rod;

a plurality of tie rods each comprising a male member having one end thereof attached to the flange portion of said one side wall of said spring means and having an external thread portion, and a female member having one end thereof screwed into the flange portion of the other side wall of said spring means and having an internal thread portion helically meshed with said external thread portion of said male member, each of said plurality of tie rods having a length which is larger than the free length of said spring when measured immediately before the leading end of said external thread portion of said male member is released from engagement with said internal thread portion of said female member, thereby preventing said one

side wall of said spring means from springing out of and said spring from bursting out of said spring box; and

a plurality of winglike members each fixedly attached to the outer periphery of said female member at a position in the vicinity of the leading end of said female member, each winglike member being provided with a pair of wing arms for engaging said female member with the outer periphery of said spring box to prevent said female member from being rotated in conjunction with rotation of said male member when said male member is being threaded into or out of said female member.

4,702,151

PISTONS

Robert Munro, and David C. Speaight, both of Lymington, United Kingdom, assignors to AE PLC, Warwickshire, England

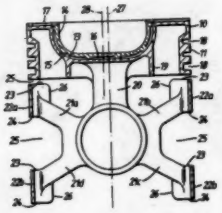
PCT No. PCT/GB85/00416, § 371 Date Apr. 30, 1986, § 102(e) Date Apr. 30, 1986, PCT Pub. No. WO86/01858, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 12, 1985, Ser. No. 860,318

Claims priority, application United Kingdom, Sep. 14, 1984, 8423050

Int. Cl.[4] F16J *1/04*

U.S. Cl. 92—237 **4 Claims**



1. A piston for an internal combustion engine comprising:

a crown defining a piston axis,

a ring band extending around the crown,

gudgeon pin bosses supporting the crown and defining a gudgeon pin bore having an axis,

two pairs of arcuate skirt portions on opposite sides of the gudgeon pin bore,

an upper arcuate skirt portion included in each pair of arcuate portions and adjacent to but spaced from the ring band by means defining a gap,

a lower arcuate skirt portion included in each pair of skirt portions and spaced from the associated upper arcuate skirt portion by means defining an axially and circumferentially extending gap,

each arcuate skirt portion being conformable and being disposed about a plane including the piston axis and normal to the gudgeon pin bore axis, extending only partially around the piston and having circumferentially extending edges spaced by side edges,

four struts projecting from each boss, two of said four struts extending upwardly and outwardly of, and on opposite sides of the associated gudgeon pin boss and being connected to respective upper arcuate skirt portions, the two remaining of said four struts extending downwardly and outwardly of, and from opposite sides of, the associated gudgeon pin boss and being connected to respective lower arcuate skirt portions,

each upper arcuate skirt portion being carried by two upwardly and outwardly extending struts and each lower arcuate skirt portion being carried by two downwardly and outwardly extending struts, whereby the skirt portions conform to the cross-sectional shape of an associated cylinder.

4,702,152

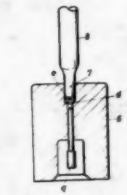
METHOD OF MANUFACTURING AN IGNITION FILE FOR A LIGHTER

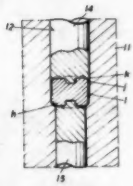
Yushin Yoneda, 1788, Mebuki, Noda, Japan

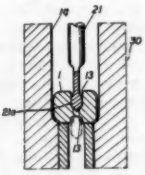
Continuation of Ser. No. 689,974, Jan. 9, 1985, abandoned. This application Sep. 23, 1986, Ser. No. 910,813

Int. Cl.[4] B21K *5/00*

U.S. Cl. 72—338 **1 Claim**







1. A method of manufacturing rotatable ignition files and flint wheels for lighters, comprising the steps of:

(a) cutting elongate wire stock of gauge appropriate to the desired diameter of the wheel into disk-shaped blanks of suitable size; each said blank having a top surface, a bottom surface, a central region, an outer diameter, and an outer periphery;

(b) applying a series of press operations to said blanks from step (a), as cut, by means of respective punches and dies to round off peripheral edges of said blanks of step (a) to provide axial mounting holes and to harden the respective surfaces of said blanks of step (a); said series of press operations including the steps of:

(b) (1) providing a first die having an opening therethrough, said opening being circumscribed by a first annular lip having a first curved surface for receiving said lower surface of said blank of step (a);

(b) (2) placing said lower surface of said blank of step (b) (1) against said first curved surface of said annular lip of said first die;

(b) (3) providing a first punch having a first punch face;

(b) (4) punching said top suface of said blank with said first punch face by passage of said first punch in said opening in said first die, to deform said blank of step (b) (2) to form a curved face on said bottom surface of said blank of step (b) (2) which conforms to said first curved surface on said first annular lip;

(b) (5) providing a second die having an opening there-

through, said opening having an enlarged portion and a narrower portion; said second die having a second annular lip at a juncture of said enlarged portion and said narrower portion, said second annular lip having a second curved surface for receiving said bottom surface of said blank of step (b) (4); said second annular lip bounding a lowermost portion of said enlarged portion of said opening of said second die; said enlarged portion of said second die in the vicinity of said second annular lip having a diameter larger than said outer diameter of said blank of step (b) (4) by a predetermined distance, to create a radial gap about said blank of step (b) (4) to permit expansion of said blank of step (b) (4) outwardly during a punching operation;

(b) (6) removing said blank of step (b) (4) from said first die and placing said blank of step (b) (4) within said opening of said second die such that said bottom surface of said blank of step (b) (4) contacts said second curved surface and is supported thereby;

(b) (7) providing a second punch for movement in said enlarged portion of said opening of said second die, and end of said second punch having a generally centrally located projection and a first curved peripheral surface surrounding said projection, said first curved peripheral surface being generally concave;

(b) (8) providing a third punch for movement in said portion of said opening of said second die, said third punch having an end having a generally centrally located projection and a second curved peripheral surface surrounding said projection of said third punch;

(b) (9) placing said end of said second punch against said top surface of said blank of step (b) (6) by movement of said second punch through said enlarged portion of said second die;

(b) (10) maintaining said second punch against said blank of step (b) (9) and placing said end of said third punch against said bottom surface of said blank of step (b) (9) by movement of said third punch through said narrower portion of said opening through said second die;

(b) (11) pressing said blank of step (b) (10) between said second and third dies to form a substantial reduction in thickness of said central region of said blank of step (b) (10), so as to form a central depression having a predetermined internal diameter on each of said top surface and said bottom surface of said blank of step (b) (10), thereby forming a curved surface on said top surface of said blank of step (b) (10) which conforms to said first curved peripheryal surface of said second punch, and thereby also forming a correspondingly curved surface on said bottom surface of said blank from step (b) (10) which conforms to said second curved peripheral surface of said third punch, thereby reducing the thickness of said central region of said blank of step (b) (10);

(b) (12) removing said second punch from said enlarged opening of said second die;

(b) (13) removing said blank of step (b) (11) from said second die;

(b) (14) providing a third die having an opening therein, said opening in said third die having a sidewall, an enlarged portion, a narrower portion, and a third annular lip at a juncture of said enlarged and narrower portions in said third die; said third annular lip being adapted for receiving said bottom surface of said blank of step (b) (13); said opening in said third die having an internal diameter which is larger by a predetermined distance than the diameter of said blank of step (b) (13) to permit expansion thereof and to create a radial gap thereabout, when said blank of step (b) (13) is resting on said third annular lip;

(b) (15) placing said blank of step (b) (12) within said opening in said third die such that said bottom surface of said blank of step (b) (13) contacts and is supported by said third annular lip of said third die;

(b) (16) providing a fourth punch having an enlarged penetrating end portion and a narrower neck portion, said enlarged penetrating end portion having a slightly smaller diameter relative to said predetermined internal diameter of said central depressions;

(b) (17) punching said top surface of said central region of said blank of step (b) (15) during a forward stroke of said fourth punch while said blank of step (b) (15) is disposed in said third die, causing resilient radial expansion of said blank of step (b) (15) radially outwardly until expansion of said blank of step (b) (15) radially is stopped by contact of said outer periphery of said blank of step (b) (15) with said sidewall of said opening in said third die;

(b) (18) continuing said forward stroke of said fourth punch until said enlarged penetrating end portion completely penetrates said blank of step (b) (17) to form a central opening having an internal sidewall through said blank of step (b) (17) and to chamfer said top surface adjacent said opening in said blank of step (b) (17);

(b) (19) continuing said forward stroke of said fourth punch until said enlarged penetrating end portion has passed completely through said central opening and said narrower neck portion is disposed within said central opening of said blank of step (b) (18), thereby permitting resilient restoration of said blank of step (b) (18) by radial contraction of said blank of step (b) (18) away from said sidewall of said opening in said third die and by radial expansion of said internal sidewall of said central opening in said blank of step (b) (18) toward said narrower neck portion of said fourth punch;

(b) (20) punching a bottom portion of said central region surrounding said central opening of said blank of step (b) (19) of said blank to chamfer said bottom surface of said blank of step (b) (19) adjacent said central opening.

4,702,153

APPARATUS FOR VENTING A KITCHEN, ESPECIALLY AN ONBOARD KITCHEN IN AN AIRCRAFT

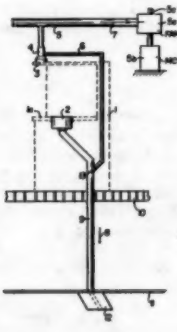
Dieter Grabow, Buxtehude, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm, Munich, Fed. Rep. of Germany

Filed Nov. 15, 1985, Ser. No. 798,731

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1984, 3442304

Int. Cl.[4] F24C *15/20*

U.S. Cl. 98—1 **2 Claims**



1. An apparatus for venting a kitchen, especially an onboard kitchen of an aircraft, comprising a counter top, a kitchen sink, a drainage duct connected to said kitchen sink, at least one exhaust conduit, an exhaust hood connected to said exhaust conduit, at least one cyclone separator (4) mounted in said exhaust conduit for dividing an airflow carrying contamination particles coming through said exhaust hood (3) into a clean airflow passing out of said exhaust conduit (5) and a contami-

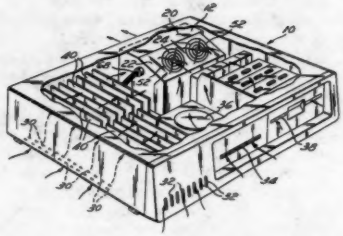
nated airflow carrying separated contamination particles, and a discharge pipe (6) connected to said cyclone separator and to said drainage duct (9) for removing said contaminated airflow into said drainage duct (9).

4,702,154

COOLING SYSTEM FOR PERSONAL COMPUTER

Douglas A. Dodson, 31510 Mountain Way, Bonsall, Calif. 92003

Filed Jan. 28, 1987, Ser. No. 7,488
Int. Cl.[4] H05K *7/20*
U.S. Cl. 98—1 **4 Claims**



1. A power supply and fan unit for IBM PC and XT personal computers, comprising:

(a) each personal computer having a computer housing formed of sheet material and having disposed inside said computer housing in a rear upper corner a power supply and fan unit housing,

(b) said unit housing having a rear wall and having an air exhaust opening in said rear wall, and said computer housing having air inlet means to admit ambient air to said computer housing disposed generally oppositely to the location of said unit housing,

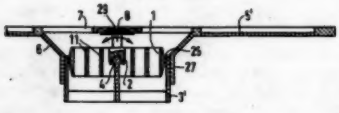
(c) said unit housing having a top wall with its uppermost portion spaced from the underside of the top of said computer housing about ½" and said top wall of said unit housing having a forward sloping top wall portion downwardly sloping at an angle of about 10° to the horizontal as it extends forwardly to facilitate air flow thereto and a pair of juxtaposed fan openings disposed in said forward sloping top wall portion and a pair of fans in said unit housing aligned with said juxtaposed fan openings to draw air therefrom and to exhaust through said air exhaust opening in said unit housing, each fan being rated at about 32 cfm.

4,702,155

AIR GUIDE ASSEMBLY IN AUTOMOTIVE VENTILATING SYSTEM

Reinhard Hildebrand, Redwitz, and Djuanarto-Adi Kusuma, Dörfles Esbach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,469
Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3510278
Int. Cl.[4] F24F *13/14*
U.S. Cl. 98—2 **11 Claims**



1. In a ventilating system of an automotive vehicle, an assembly for adjustably controlling the direction of air flow into a passenger compartment of said vehicle, said assembly comprising:

a housing having an air inlet end and an air outlet end, said housing defining a direction of inflowing air extending from said inlet end towards said outlet end;

an integral air guide element including a multiplicity of air deflection components rigidly connected to one another, said air guide element being disposed in said housing; and

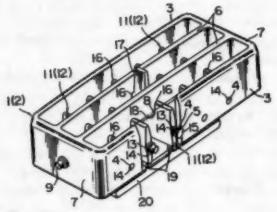
coupling means for rotatably connecting said air guide element to said housing, said coupling means including a ball and socket joint disposed at a geometrical center of said guide element, said guide element being mounted to said housing in a snap lock by means of said ball and socket joint.

4,702,156

VENTILATOR GRILL AND METHOD FOR ASSEMBLING THE SAME

Yosiaki Sano, Fuji, Japan, assignor to Nihon Plast Co., Ltd., Shizuoka, Japan

Filed Nov. 18, 1985, Ser. No. 799,075
Claims priority, application Japan, Nov. 19, 1984, 59-244270; Nov. 19, 1984, 59-244271; Nov. 26, 1984, 59-249410
Int. Cl.[4] F24F *13/15*
U.S. Cl. 98—40.24 **11 Claims**



8. A method for assembling a ventilator grill which includes an outer frame formed from a first synthetic resin, said outer frame having two pairs of side walls, the side walls of each of said pairs being parallel to each other, at least one stationary vane extending between the side walls of a first pair of said pairs of side walls and being parallel to the side walls of said second pair of side walls, and a plurality of through holes provided in each side wall of said second pair of side walls, and at least one movable vane extending across said stationary vane and between the side walls of said second pair of side walls, said method comprising:

first molding an outer frame of a first synthetic resin in a mold;

disposing said molded outer frame within a mold half and closing said mold with a second mold half to form a complete mold having a molding cavity, a part of which is defined by a part of an edge surface of said stationary vane and said through holes in said side walls of said outer frame;

injecting a second synthetic resin, having no bondability to said first synthetic resin and having a melting point lower than that of said first synthetic resin, into said molding cavity, thereby forming in said complete mold cavity and said molded outer frame at least one movable vane extending across said stationary vane in said molded outer frame and journal shafts projecting from each of said opposite sides of said movable vane into said through holes in said side walls for permitting said movable vane to swing in an arc about an axis of said journal shafts; and

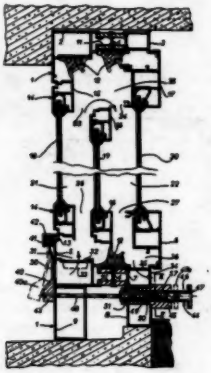
cooling and removing said ventilator grill.

4,702,157

AUTOMATIC AERATION WINDOW

Jean-Daniel Comparon, 22, rue de Metz, F-68071 Mulhouse Cedex, France

PCT No. PCT/FR85/00299, § 371 Date Jun. 23, 1986, § 102(e) Date Jun. 23, 1986, PCT Pub. No. WO86/02692, PCT Pub. Date May 9, 1986
PCT Filed Oct. 23, 1985, Ser. No. 885,606
Claims priority, application France, Oct. 31, 1984, 84 16778
Int. Cl.[4] E06B 7/10
U.S. Cl. 98—97 17 Claims



1. In a window equipped with three parallel window panes and an aeration circuit comprising:

a fixed frame and a mobile frame formed of three frame elements consisting of an outer frame element and an inner frame element respectively supporting an outer pane, an intermediate pane and an inner pane defining therebetween two parallel gaps communicating via a first upper slit at the top of a first gap formed between said outer and inner panes, an upper intermediate passage and second upper slit at the top of a second gap between said intermediate and inner panes;

an external opening at the outer face of the window communicating with a first lower passage and a first lower slit at the bottom of said first gap, and an internal opening at the inner face of the window communicating with a second lower passage and a second lower slit at the bottom of said second gap; and

flap means associated with control means;

the improvement wherein said three frame elements forming said mobile frame are respectively arranged so that said outer and intermediate frame elements define said first upper and lower slits with said first gap therebetween, and said intermediate and inner frame elements define said second upper and lower slits with said second gap therebetween, wherein said upper intermediate passage extends within said mobile frame above said intermediate frame element and between said outer and inner frame elements; and

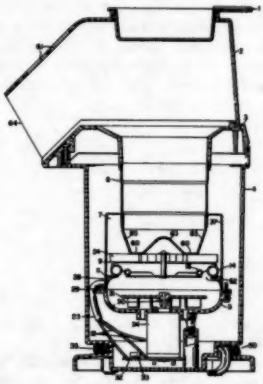
wherein said fixed frame contains in the bottom part thereof said external opening, said first lower passage and a first lower opening which are so arranged in the fixed frame that said external opening may communicate with the bottom of said first gap via said first lower passage and said first lower opening in the fixed frame and said first lower slit in the mobile frame and wherein said fixed frame further contains a flap and said control means which are thereby operatively associated with said external opening within said fixed frame.

4,702,158

POPCORN POPPER HAVING IMPROVED HEATED AIR FLOW

Naoki Ishihara, Flat 209, Viking Villa, 70 Tin Tau Temple Rd., Hong Kong, Hong Kong

Filed Feb. 14, 1986, Ser. No. 829,771
Int. Cl.[4] A23L 1/18; F26B 3/08
U.S. Cl. 99—323.5 10 Claims



1. A popcorn popper using heated air flow to produce popping of the corn, comprising

a circular cylindrical popping chamber having a bottom surface and an open top, said bottom surface having a plurality of openings;

a motor;

a fan connected to and driven by said motor;

a heating element disposed above said fan;

means for directing air blown by said fan to contact and be heated by said heating element, and then for directing the heated air outward radially and upwardly; and

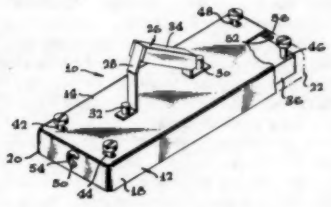
diffusing means disposed between said bottom surface and said means for directing, and comprising a plurality of radially extending fins, said diffusing means dividing and directing said heated air inward radially and upward and substantially evenly through said openings in said bottom surface of said popping chamber.

4,702,159

FOOD PRESS

Louis S. Polster, 1017 Fairmount Rd., Burbank, Calif. 91501

Continuation-in-part of Ser. No. 678,699, Dec. 6, 1984, Pat. No. 4,635,538. This application Jan. 12, 1987, Ser. No. 2,010
Int. Cl.[4] A47J 37/06
U.S. Cl. 99—349 11 Claims



1. A food press comprising:

a cooking plate therein for placement on the top of a food product positioned on a heated griddle to press the food product against the griddle, said cooking plate having sufficient thermal mass that when said cooking plate is

first heated on the griddle substantially to griddle temperature and thereafter placed on the food product it supplies sufficient heat to the food product to cook the upper portion of the food product;

said food press having a skirt, said skirt having sides and top to surround the sides and top of said cooking plate, a handle on said press so that said press may be manually lifted on and off a griddle and manually lifted on and off a food product on the griddle, said cooking plate being movably mounted with respect to said skirt; and

detent means interengaging said skirt and said cooking plate to selectively retain said cooking plate up within said skirt and to selectively permit said cooking plate to rest upon a griddle while said skirt rests upon the griddle around the periphery of said cooking plate.

4,702,160

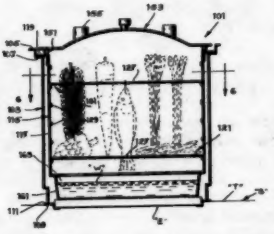
STEAM COOKING DEVICE

Jean L. Manganese, 7144 Chabot, apt. 2, Montreal, Quebec, Canada H2E 2K5

Division of Ser. No. 826,842, Feb. 6, 1986, Pat. No. 4,649,811. This application Sep. 25, 1986, Ser. No. 893,612

Int. Cl.[4] A47J *27/04*

U.S. Cl. 99—417 **4 Claims**



1. A cooking device comprising:

(a) an outer shell having an open top and an open bottom, the open bottom of said outer shell being sized to fit about a heating element;

(b) a food support member provided within the outer shell for supporting food to be cooked, said support member comprising:

an inner shell having an open top and a bottom closed by a wall provided with a plurality of openings;

support means provided at the open top of the inner shell, said support means cooperating with the open top of the outer shell to suspend said inner shell generally concentrically within said outer shell with the bottom wall of said inner shell being spaced above the bottom of said outer shell to provided enough room at the bottom of said outer shell for a water container;

at least one food support shelf sized to fit within the inner shell, said at least one shelf having a plurality of openings through which food to be cooked can be suspended; and

means provided on the inner surface of the inner shell for supporting said at least one shelf in at least one generally horizontal position above the bottom wall of said inner shell; and

(c) a cover for simultaneously closing the open tops of the inner and outer shells.

4,702,161

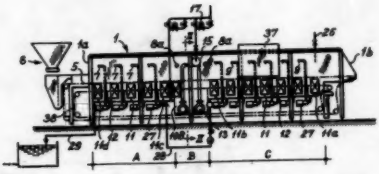
SPRAY-TYPE INTEGRATED VEGETABLE BLANCHER AND COOLER

Niels J. Andersen, 3 StÅlbjergvej, DK-5683 Broby, Denmark

Filed Jan. 30, 1985, Ser. No. 696,666

Int. Cl.[4] A23N *12/00*; A23L *3/00*

U.S. Cl. 99—470 **17 Claims**



1. An apparatus for blanching vegetable products and comprising in combination:

an elongate casing having a product inlet end and a product outlet end, said casing including longitudinally extending, opposite and spaced apart side walls, a floor which extends between said inlet and outlet ends and closes the spacing between said side walls to define a product treatment tunnel above said floor, and successive product treatment zones between said inlet and outlet ends of said elongate casing within said product treatment tunnel,

a perforated product conveyor belt having an upper belt run for receiving and supporting a layer of vegetable product thereon and for moving said layer from said inlet end, through said product treatment zones to said outlet end, said upper belt run being arranged to move above said floor in spaced relation thereto,

a product feeder unit arranged at said product inlet and for receiving said vegetable product and supplying and distributing said vegetable product to said conveyor belt as an even layer across said upper belt run,

a product blanching zone arranged in said treatment tunnel as a first one of said treatment zones therein and comprising a blancher nozzle arrangement including a plurality of spray nozzles arranged to spray heated blanching liquid onto said layer of product on said upper conveyor belt run,

a product cooling zone arranged in said treatment tunnel as a successive treatment zone therein after said blanching zone therein, said cooling zone comprising a nozzle arrangement including a plurality of spray nozzles arranged to spray cooling liquid onto said layer of product on said upper conveyor belt run,

a sectioned liquid collecting sump arranged to receive liquid from said product treatment tunnel at said floor thereof, sump sections below said blanching zone being separated from sump sections below said cooling zone,

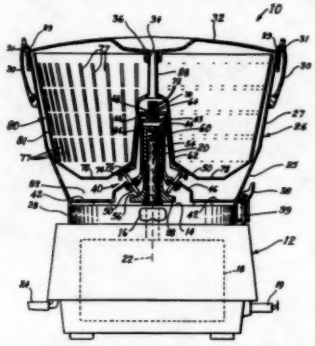
at least one circulation pump for transferring said blanching liquid from an associated sump section below said blanching zone to said blancher nozzle arrangement for spraying therethrough, said transfer being performed through means for controlled heating of said blanching liquid, and said blancher nozzle arrangement including upper spray nozzle units arranged above said upper conveyor belt run and directed toward a top surface thereof, as well as lower spray nozzle units arranged in the spacing between said floor and said upper belt run and directed toward an underside of said belt run.

4,702,162

SALAD SPINNER DRYER APPARATUS ROTATED BY SPEED REDUCING FRICTION DRIVE FOR USE WITH FOOD PROCESSORS

Carl G. Sontheimer, Greenwich, and James E. Williams, Stamford, both of Conn., assignors to Cuisinarts, Inc., Greenwich, Conn.

Filed Apr. 14, 1987, Ser. No. 38,231
Int. Cl.[4] A47J 43/04; F26B 17/24
U.S. Cl. 99—495 20 Claims



1. For use with having a base housing containing an electrical motor drive, with a deck located on top of the base housing for removably mounting a working bowl thereon in predetermined engaged fixed position, and having tool drive means projecting above said deck and being rotatable by said motor drive at a first rotational speed in the range of about 1,650 PRM to about 1,800 RPM around a main vertical axis of rotation, salad spinner apparatus comprising:

an upstanding auxiliary bowl removably mountable upon said deck in said predetermined engaged fixed position thereon,

said upstanding auxiliary bowl having an uninterrupted side wall and a bottom trough for catching and holding any water which drains down the inside surface of said side wall,

a removable coupling sleeve engageable with said tool drive means for rotation thereby about said main vertical axis,

said coupling sleeve having an exterior friction drive surface concentric with said main vertical axis,

said exterior friction drive surface having a radius "r" from said main vertical axis,

at least one freely rotatable wheel having a wheel axis connected to said upstanding auxiliary bowl for holding said wheel axis stationary,

said wheel having a perimeter rolling against said exterior friction drive surface of radius r,

a driven rotor member rotatable about said main vertical axis and having an interior friction drive surface concentric with said main vertical axis,

said interior friction drive surface having a radius "R" from said main vertical axis, and said radius R being larger than said radius r,

said perimeter of said wheel rolling against said interior friction drive surface of radius R for turning said driven rotor member at a second rotational speed which is less than said first rotational speed as a function of radius r divided by radius R,

a rotatable basket positioned within said upstanding auxiliary bowl and being rotatable around said main vertical axis, and

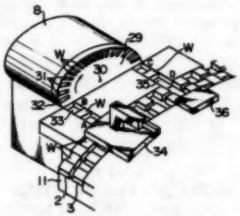
said rotatable basket being coupled to said driven rotor member for rotation therewith at said second rotational speed.

4,702,163

PRINTING APPARATUS FOR PRINTING BOTH SURFACES OF CHIP TYPE ARTICLE

Mikio Araki, Toyonaka; Shigeru Yonamine, Takatsuki, and Kouichi Yukawa, Nagaokakyo, all of Japan, assignors to Idec Izumi Corporation, Osaka, Japan

Filed Mar. 10, 1986, Ser. No. 837,938
Claims priority, application Japan, Mar. 11, 1985, 60-48743; Apr. 27, 1985, 60-91639
Int. Cl.[4] B41F 17/00; B65G 47/00
U.S. Cl. 101—35 10 Claims



1. A printing apparatus for printing on both surfaces of a chip type article comprising:

first and second transfer paths for transferring said chip type article;

a feed device for feeding said article to said first transfer path;

a printing device for printing on said article on said first transfer path and on another article on said second transfer path;

a removing device for removing said printed article from said second transfer path; and

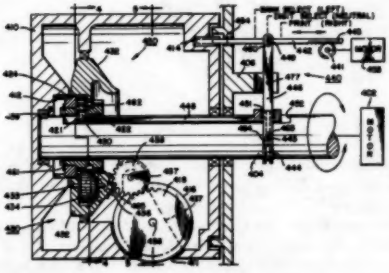
an article reversing device for reversing upsidedown said printed article on said first transfer path and for delivering said article to said second transfer path, wherein said first and second transfer paths are formed along concentric circles.

4,702,164

VALUE SELECTOR SECURITY SYSTEM

Arno Muller, Westport, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 657,656, Oct. 4, 1984, abandoned. This application Oct. 16, 1986, Ser. No. 919,581
Int. Cl.[4] B41L 47/46; B41J 1/34
U.S. Cl. 101—91 11 Claims



1. A postage meter for printing selected value amounts on a print receiving surface, comprising:

a rotatable print drum,

a plurality of value print wheels mounted within the print drum and each having a plurality of value print elements,

said print wheels being selectively adjustable to align selected value print elements in an operative position in which they are composed at the surface of the drum, means for rotating said print drum to move the selected value print elements through a printing position to form an imprint on a said print receiving surface,

value selection means comprising a plurality of rotatable gear means arranged in an annular array about the rotational axis of the print drum and connected to respective value print devices and a pinion for rotating said gear means one at a time to adjust said print devices to align selected print elements, said pinion being mounted on an annular member rotatable about the rotational axis of the print drum to transfer said pinion from gear means to gear means, and

locking means on said annular member engageable with said gear means other than said one being adjusted by said pinion for locking said gear means against movement.

4,702,165

FLUID PRESSURE SCREEN PRINTING APPARATUS, HOLDER AND ASSEMBLY

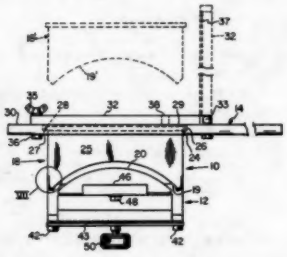
Ronald C. Anderson, 1515 Woodland Dr., Pittsburg, Kans. 66762

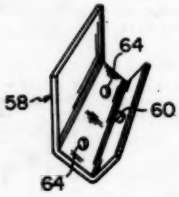
Continuation-in-part of Ser. No. 597,503, Apr. 6, 1984, Pat. No. 4,590,854. This application Mar. 19, 1985, Ser. No. 713,774

The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.

Int. Cl.[4] B41F *15/30, 15/38, 17/00*

U.S. Cl. 101—114 **17 Claims**





1. Screen printing apparatus for directly printing indicia on a substrate using fluid pressure, said printing apparatus including:

at least one screen print assembly including a screen holder having a screen upon which ink can be placed;

exterior flange means extending around said screen holder for removably supporting said screen holder in said screen print assembly;

closure means for said screen holder;

means on said closure means for sealing said screen holder in said screen print assembly; and

means for introducing fluid under pressure to said screen holder to force ink through said screen to print indicia on said substrate,

whereby said exterior flange means supports said screen holder in said screen print assembly.

17. A clip for mounting a framed screen in registration on bottom edges of a screen holder wherein each end of the screen frame includes a slot, said clip including three leg sections, two of which form an obtuse angle and including means for attaching the clip to the screen holder, said attachment means being in one of the two leg sections and a pin extending from the third of said leg sections for engagement with said slot in the screen frame.

4,702,166

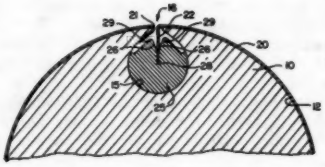
PLATE LOCK-UP MECHANISM FOR PRINTING PRESSES

Louis S. Depa, Downers Grove, Ill., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 28, 1986, Ser. No. 901,237

Int. Cl.[4] B41F *27/06, 27/12*

U.S. Cl. 101—415.1 **2 Claims**



1. In a printing press plate lockup for holding a flexible printing plate having a first hooded end and a second end, the combination comprising:

(a) a plate cylinder defining a longitudinal slot of substantially circular cross section extending across the width of said plate cylinder, said slot having undercut edges defining a narrow gap in the surface of said plate cylinder;

(b) a rotatable locking shaft mounted in the slot, said locking shaft having:

(i) outwardly extending lobes having walls defining a generally radially inwardly extending opening which terminates in a slot portion having a constant thickness slightly greater than the thickness of the printing plate; said lobes being equidistantly spaced from each other on each side of the centerline of said radially extending opening and having rounded locking edges, wherein said lobes are defined on one side by said walls defining said radially extending slot and on the other side by walls that are relieved from the outer surface of said shaft whereby said locking edges are located radially nearer the center of said locking shaft than is the outer surface of said locking shaft;

(c) means for rotating said shaft between locking and non-locking positions and holding the plate under tension when in the locked position.

4,702,167

PROPELLANT-CHARGE MODULE

Kalrheinz Reinelt, Hermannsburg, and Michael Schwenzer, Duesseldorf, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

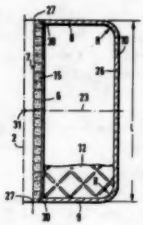
PCT No. PCT/EP85/00433, § 371 Date Jun. 6, 1986, § 102(e) Date Jun. 6, 1986, PCT Pub. No. WO86/01584, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 24, 1985, Ser. No. 858,209

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1984, 3432291

Int. Cl.[4] F42B 5/38

U.S. Cl. 102—282 10 Claims



1. A propellant-charge pack comprising:

an annular envelope having an outer wall extending along and centered on an axis, a pair of axially spaced end walls extending transversely inward from the axis and having inner peripheries centered on the axis, and an inner wall defining a clear axially throughgoing passage between the inner peripheries of the end walls, the envelope being generally axially symmetrical about the axis and substantially symmetrical to a plane perpendicular to the axis midway between the end walls;

a relatively easily ignited primer charge forming a part of the inner wall symmetrical of the plane;

a propellant charge filling the envelope between the walls outward of the inner wall;

the primer charge being formed by a plurality of axially stacked rings lying radially within and supported by the inner wall.

4,702,168

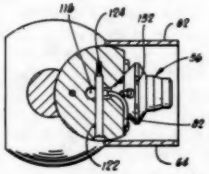
SIDEWALL CORE GUN

Edward A. Colle, Jr., Houston; Donald N. Yates, Jr., Katy, both of Tex., and Emmet F. Brieger, Nogal, N. Mex., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 556,881, Dec. 1, 1983, Pat. No. 4,609,056. This application Jan. 29, 1986, Ser. No. 824,982

Int. Cl.[4] F42D 3/00

U.S. Cl. 102—313 2 Claims



1. A cartridge assembly for a sidewall core gun for transferring the energy form a detonating cord upon the detonation thereof to propel a coring bullet from said gun, said cartridge assembly comprising:

a housing defining therein a first chamber at one end of said housing and a second chamber at the other end of said housing;

an output charge disposed within a portion of the second chamber at the other end of said housing, said output charge having a first end surface and a second end surface;

a first transfer charge having a first end surface and a second end surface being disposed within the first chamber in said housing, said first transfer charge having the first end surface thereof located adjacent said detonating cord and being capable of transmitting energy from said detonating cord upon the detonation thereof; and

a second transfer charge disposed within a portion of the second chamber and having a portion thereof in contact throughout the first end surface of said output charge and having a portion thereof in contact with the second end surface of said first transfer charge, said second transfer charge capable of transferring energy from said first transfer charge to said output charge to cause the activation thereof.

4,702,169

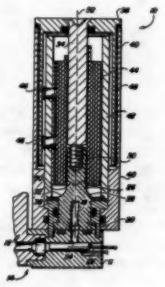
FIRING TRAIN FUNCTION INDICATOR

W. Keith Gallant, Plymouth, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 29, 1987, Ser. No. 8,237

Int. Cl.[4] F42B 23/24

U.S. Cl. 102—401 7 Claims



1. In a land mine **16** having a firing train and means for self neutralizing its firing train, the improvements comprising:

a visual safe indicator **10** mounted on the land mine **16**, said visual safe indicator including an explosive bolt **20** having an upper portion **30** and a lower portion **32** for explosively separating the upper portion **30** from the lower portion **32**;

compressed spring means **44** having two ends **45**, **47**;

means for securing one end **45** of the compressed spring means **44** to the upper portion **30** of the explosive bolt and the other end **47** of the compressed spring means **44** to the lower portion **47** of the explosive bolt;

highly visible means **48** attached to the upper portion **30** of the explosive bolt **20**; and

means for mounting **11** the visual safe indicator **10** on the land mine **16** so that when the mine **16** self neutralizes, the explosive bolt **20** separates its upper portion **30** from its lower portion **32** for deploying the highly visible means **48**.

4,702,170

SHOTSHELL CARTRIDGE ADAPTER

Ronald E. Trudeau, Star Rte. #85, Ashfield, Mass. 01330

Filed Oct. 14, 1986, Ser. No. 918,559

Int. Cl.[4] F42B 5/02, 9/02

U.S. Cl. 102—446 7 Claims

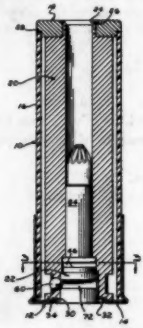
1. A cartridge adapter for firing subcaliber rim-fire shot cartridges in a standard shotgun, wherein the adapter comprises:

a. an adapter tube having upper and lower ends, wherein the tube has a central passageway that houses and totally encloses said subcaliber cartridge, said passageway having two stepped portions that successively widen the passageway adjacent the tube's lower end;

b. a firing pin mechanism removably located within the stepped portions by a ball-and-detent arrangement, said mechanism comprising:

i. a cylindrical breech bushing removably housed within the stepped portions, said bushing having a central throughbore;

ii. a secondary firing pin slidably housed within the bushing's throughbore, said secondary firing pin having a T-shaped piston configuration comprised of a vertical stem, slidably retained inside the throughbore by a spring-biased midportion, and an integral horizontal



portion that normally sits atop the breech bushing, said horizontal portion having an upper face with a chisel-pointed protrusion along the rim of that face;

iii. wherein a free end of the stem is adjacent the lower end of the breech bushing but recessed slightly therefrom inside the throughbore;

c. wherein the adapter tube's passageway has an annular shoulder vertically spaced above the chisel-pointed protrusion for removably retaining the base of subcaliber ammunition between the protrusion and the shoulder, whereby said base is normally spaced apart and above the entire upper face of the secondary firing pin except for that portion resting on the chisel-pointed protrusion; and

d. an outer housing that envelopes and is affixed to the adapter tube, wherein the outer housing has a shape that resembles a standard shotgun shell hull.

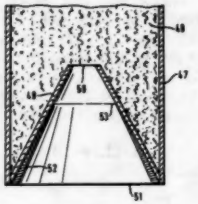
4,702,171
HOLLOW CHARGES

Reuven Tal, Kiron; Dov Chaiat, Kfar Saba, and Eitan Hirsch, Netanya, all of Israel, assignors to The State of Israel, Ministry of Defence, Israel Military Industries, Israel

Filed Jun. 26, 1986, Ser. No. 878,621
Claims priority, application Israel, Dec. 12, 1985, 77309
Int. Cl.[4] F42B *11/22*
U.S. Cl. 102—476 **6 Claims**

1. In a bomb comprising an axially extending shaped charge warhead section having an explosive charge having a surface defining a free space and an internal liner having a dimension that increases axially symmetrically from an inner apex or narrow end to a front end or base, the liner having an outer side facing the space-defining surface of the shaped explosive charge and an inner side facing away from the space-defining surface of the explosive charge, the improvement comprising:

a coating applied to the inner side of said liner formed of a metal having a density greater than the density of the material from which the liner is formed, said coating extending from an inner end to the front end or base of the liner, the inner coating end being defined by a circumferential line of the liner formed at the intersection of the inner side of the liner with a notional cylinder coaxial with



the liner and having a radius not exceeding R/4 where R is the inner radius of the liner at its front end or base, the thickness of the coating at least at said inner end or at each point meeting the equation

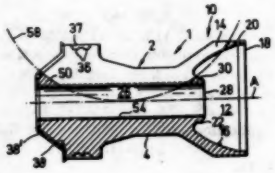
$$T_c \cdot \rho_c / \sin\frac{2\beta}{2} < T_l \cdot \rho_l / \cos\frac{2\beta}{2}$$

where T_c is the coating thickness at a given circumferential line x, T_l is the liner thickness, ρ_c is the coating density, ρ_l is the liner density and β is the collapse angle at the circumferential line x.

4,702,172
SABOT ARRANGEMENT FOR A SUB-CALIBER PROJECTILE

Peter Wallow, Duesseldorf; Klaus Gersbach, Willich; Walter Simon, Heizogenrath; Bernhard Bisping, Ratingen, all of Fed. Rep. of Germany; Patrick Montier, and Pierre A. Moreau, both of Bourges, France, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany and Etat Francais represente par le Deleuge General pour l'armement, Paris, France

Continuation-in-part of Ser. No. 642,713, Aug. 20, 1984. This application May 14, 1985, Ser. No. 733,965
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1980, 30330417
Int. Cl.[4] F42B *13/16*
U.S. Cl. 102—521 **10 Claims**



1. Sabot for a fin-stabilized subcaliber projectile having a large length/diameter ratio, wherein said sabot embraces said subcaliber projectile in a predetermined region between its nose and its tail stabilization unit, said sabot comprising

(a) a unitary sabot body

(b) said sabot body having an axial bore and a plurality of angularly equidistantly spaced partial radial cuts defining gaps which partially divide said sabot body into a plurality of equal partial segments;

(c) a mating insert mounted in each gap;

(d) each gap forming a fracture zone in the outer periphery of said sabot;

(e) means for joining said sabot to said subcaliber projectile;

(f) means for sealing at least the radially outer region of the gap formed by each cut;

(g) said sabot forming a forwardly directed air pocket and each cut forming in said air pocket a forwardly disposed radially outer and a radially disposed inner material bridge;

(h) each cut forming at least one rearwardly disposed material bridge;

(i) said forwardly disposed and rearwardly disposed material bridges abutting against the insert mounted in each gap;

(j) each insert in each gap having a radially innermost portion which extends along said axial bore, said radially innermost portion of each insert and said axial bore forming an internal thread;

(k) said inserts sealing said gaps in a gas-tight manner; and

(l) said sabot having an outer annular groove for matingly receiving a sealing ring therein.

4,702,173

VEHICLE SUPPORTED IN CANTILEVER FASHION AND SWITCHING OF AT RAIL DIVERGENT JUNCTIONS

Francis C. Perrott, The Manor House, South Cerney, Cirencester, England

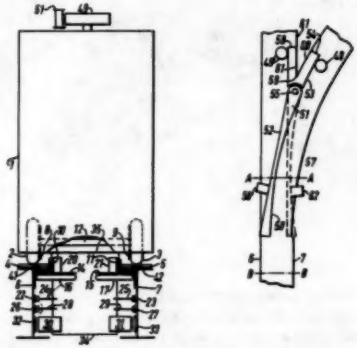
PCT No. PCT/GB82/00246, § 371 Date Apr. 7, 1983, § 102(e) Date Apr. 7, 1983, PCT Pub. No. WO83/00466, PCT Pub. Date Feb. 17, 1983

PCT Filed Aug. 6, 1982, Ser. No. 486,289

Claims priority, application United Kingdom, Aug. 8, 1981, 8124309; Jan. 22, 1982, 8201812

Int. Cl.⁴ E01B *25/06*

U.S. Cl. 104—130 **11 Claims**



1. Means of transportation comprising a guideway and at least one vehicle, including an integral load-carrying compartment, traversing said guideway, the guideway including a divergent junction and selectively operable switching means being provided to direct the vehicle to follow either the left hand or right hand path out of the junction, said vehicle including bottom support means adjacent the bottom of the load-carrying compartment and at both sides of the vehicle for engagement with lower support rails on the guideway, and cantilever support means for engagement with upper guide surfaces provided on the guideway, said cantilever support means being duplicated on both sides of the vehicle and including one and the same upper follower, for engagement with an upper guide surface on the guideway, common to both said cantilever support means so that the vehicle may be supported in cantilever fashion from either side on a single lower support rail and a single upper guide surface, the divergent junction including a selection portion having only two lower rails which are initially simultaneously used for bottom support of the vehicle at both sides and which consist of a left hand lower rail extending continuously and only into the left hand path out of the junction and a right hand lower rail which diverges from the left hand rail and extends continuously and only into the right hand path out of the junction, the aforesaid switching means directing the vehicle to follow a selected one of said lower rails so that as the vehicle traverses the selection portion of the junction the bottom support means at one side of the vehicle remains in engagement with its associated lower rail while the bottom support means at the other side of the vehicle is brought out of engagement with its associated lower rail, the selection portion of the junction also including upper guide surfaces one of which is engaged by the cantilever support means of the vehicle, whichever path out of the junction is selected by the switching means, in such manner that the vehicle is supported in cantilever fashion by said one lower rail and said upper guide surface as it traverses said selection portion of the junction, the guideway further providing, upstream of said selection portion of the junction, and downstream thereof, in each path out of the junction, an upper guide surface and only one lower support rail at one side of the vehicle so that the vehicle is cantilever supported as it approaches and as it leaves the divergent junction, one of the lower support rails in the selection portion of the junction comprising a continuation of said lower support rail upstream of the junction and leading to the lower support rail in one path out of the junction and the other lower support rail in the selection portion leading to the lower support rail in the other path out of the junction, the lower support rails in the selection portion being parallel in an initial stretch of the selection portion so as to provide temporary bottom support at both sides of the vehicle as it traverses said initial stretch of the selection portion.

4,702,174

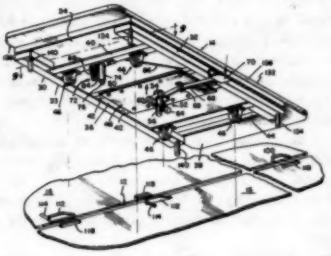
CONVEYOR SYSTEM WITH SELECTIVELY DISENGAGEABLE CARTS

Gilman Tredwell; Kenneth N. Kraft, both of Evansville, and Felix A. Ampon, Newburgh, all of Ind., assignors to George Koch Sons, Inc., Evansville, Ind.

Filed Feb. 27, 1986, Ser. No. 833,170

Int. Cl.⁴ B61B *10/04*; B61K *7/02*

U.S. Cl. 104—172.2 **15 Claims**



1. An endless conveyor system having individual, rolling, work carrying carts supported on a floor, the conveyor system comprising:

a guide track mounted in the floor;

an endless drive means in said guide track;

retractable guide means attached to each of said individual carts and movable between an extended position and a retracted position for engaging said guide track to guide said carts along said guide track when the guide means is in the extended position;

retractable engaging means attached to each of said individual carts and movable between an extended position and a retracted position for selectively engaging said endless drive means to move each of said individual carts independently along said guide track when the engaging means is in the extended position;

first means for retracting said engaging means to disengage said engaging means from said drive means to stop each of said individual carts along said guide track; a portion of said first retracting means being mounted on said floor at a location substantially adjacent said guide track;

second means for retracting said guide means to disengage said guide means from said guide track to permit each of said individual carts to be reoriented on said guide track, a portion of said second retracting means being mounted on said floor at a location substantially adjacent said guide track; and

pivotal retaining means attached to each of said individual carts for selectively retaining the guide means in the retracted position, said retaining means selectively controlled by a repositioning means.

9. A cart for an endless conveyor system including a guide track to guide the cart and a drive means to move the cart along the guide track, the cart comprising:

an upper platform having a plurality of legs attached thereto;

a lower frame having a generally horizontal upper surface defining a plane and including roller means to roll along the guide track;

a plurality of mounting pins attached to said lower frame for cooperating with said leg means on said upper platform when said upper platform is in a first orientation with said lower frame to support said upper platform in a spaced apart, parallel relation with said plane of said lower frame a first distance above said plane; and

second support means on said lower frame for cooperating with said leg means on said upper platform when said upper platform is in a second orientation with said lower frame to support said upper platform in a spaced apart, parallel relation with said plane of said lower frame a second distance above said plane, wherein said first distance is greater than said second distance, and wherein said second support menas includes both a portion of said lower frame that is formed to include openings to receive said plurality of legs and said upper surface of said lower frame that is configured to support said upper platform.

10. A cart for an endless conveyor system including a guide track to guide the cart and a drive means to move the cart along the guide track, the cart comprising:

a frame having roller means to roll along the guide track;

retractable engaging means attached to said cart and movable between an extended position and a retracted position for selectively engaging said drive means when the engaging means is in the extended position to move said cart along said guide track;

retractable guide means separate from said engaging means and attached to said cart and movable between an extended position and a retracted position for selectively engaging said guide track when the guide means is in the extended position to guide said cart along said guide track; and

pivotal retaining means attached to said cart for selectively retaining the guide means in the retracted position, said retaining means selectively controlled by repositioning means.

4,702,175

TROLLEY WITH CABLE SUSPENSION

Ulrich Brudereck, Iserlohn, and Klaus-Dieter Gabriel, Wetter, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Mar. 8, 1985, Ser. No. 709,506

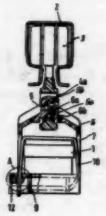
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409628

Int. Cl.[4] B61B *3/00*

U.S. Cl. 105—154 **10 Claims**

1. In a trolley having rollers for running on a rail further having a frame for these rollers, a cable suspension construction suspended from the frame comprising:

a closed loop element suspended from said trolley frame and having two aligned slots and looping in a plane transversely to a direction of trolley movement; a clamping band connected to the loop element, the two slots in said loop element being traversed by said clamping band for



releasably clamping a cable resting on a lower cable support portion of the loop element thereagainst.

4,702,176

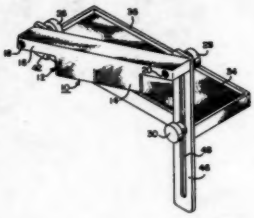
SHELF FOR HOSPITAL BED

Henry M. Goshow, 2343 Bethlehem Pike, Hatfield, Pa. 19440

Filed Aug. 25, 1986, Ser. No. 899,723

Int. Cl.[4] A47F *5/12*

U.S. Cl. 108—9 **5 Claims**



1. A shelf construction for an adjustable type of hospital bed of the type including an angularly elevating rail comprising

a planar shelf adapted to be easily connected to the hospital bed, the shelf having first and second ends;

bracket means pivotally connected to the shelf to removably affix the shelf to the said angularly elevating hospital bed rail, the bracket means comprising an elongate body having first and second ends and a flange depending along one side of the body, the flange being adapted to contact the periphery of the angularly elevating bed rail;

link means intermediate the shelf and the bracket means to change the orientation of the plane of the shelf relative to a longitudinal plane drawn through the elevating rail, the link means comprising an elongated link, the elongated link being interconnected between one end of the shelf and one end of the bracket means, the elongated link being provided with a longitudinally extending slot, and a short link, the short link being interconnected between the second end of the shelf and the second end of the bracket means,

the elongate body of the bracket means comprising a first side and a second side and wherein the elongated link and the short link connect to the body at one side and the flange depends from the other side of the body; and

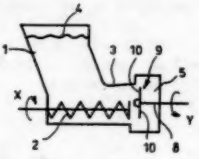
means to secure the shelf in generally horizontal alignment without regard to any particular angularly adjusted position of the hospital bed itself.

4,702,177

WASTE PRODUCT FEEDER

Minoru Narisoko, and Mikio Kiyotomo, both of Matsudo, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 2, 1986, Ser. No. 858,653
Claims priority, application Japan, May 14, 1985, 60-102418
Int. Cl.[4] F23K 3/14
U.S. Cl. 110—110 21 Claims



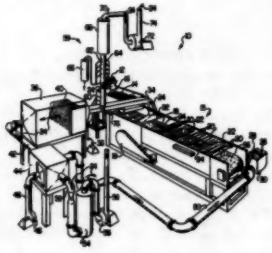
1. A waste product feeder for waste products comprising a hopper into which waste products are charged, a horizontal trough connected to a lower end of said hopper into which the waste products are moved, a screw operable in said trough for transporting the waste products in a horizontal direction, said trough having a discharge port through which said waste products are discharged, the waste products being compressed and accumulated in the trough and discharge port above a discharge end of the screw as they are successively forced by the screw toward the discharge port, and a scraper rotatably disposed in the discharge port and located to pass above the upper half portion of the discharge end of the screw for cutting off a predetermined quantity of the waste products transported to the discharge end of the screw.

4,702,178

EMERGENCY EXHAUST SYSTEM FOR HAZARDOUS WASTE INCINERATOR

James N. Welsh, Dallas, Tex., assignor to Shirco Infrared Systems, Inc., Dallas, Tex.

Filed May 27, 1986, Ser. No. 867,211
Int. Cl.[4] F23N 5/24
U.S. Cl. 110—193 28 Claims



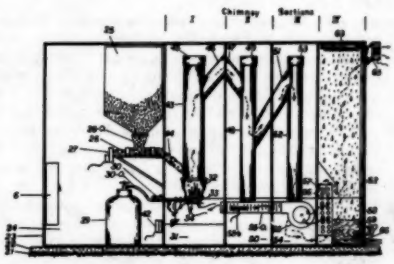
1. An incineration system, comprising:
an incinerator adapted for combusting waste materials;
a main cleaning system coupled to the output of said incinerator for cleaning volatile combustion products from said incinerator, said main cleaning system including at least one component critical to either the processing of the hazardous waste into less hazardous form or the isolation of the hazardous waste from the environment, means for sensing a malfunction provided for said at least one component and for said incinerator;
a normally inoperable emergency exhaust system coupled to said incinerator;
said means for sensing a malfunction operable to render said emergency exhaust system operable in response to a malfunction of said incinerator or said main cleaning system.

4,702,179

CONTROLLED COAL BURNING AND HEAT COLLECTING METHOD AND APPARATUS

Henry T. Childs, Chattanooga, Tenn., assignor to Temperature Adjusters, Inc., Chattanooga, Tenn.

Filed Apr. 18, 1984, Ser. No. 601,655
Int. Cl.[4] F23J 15/00
U.S. Cl. 110—215 6 Claims



1. The method of burning a fixed amount of coal or fuel per hour in a near clean fashion with minimum maintenance and extracting and storing near all the heat produced, comprising the steps of
a. constructing a flat sized base of concrete or of other suitable material,
b. constructing a support frame on said base,
c. constructing an air tight box, having a top surface and having a side door for servicing,
d. installing the end of a selected size vertically positioned metal pipe down through the top surface of the air tight box,
e. installing a sized flat perforated metal grate in said box against the lower end of said vertical pipe, thus creating a firebox area, with said grate having means for moving away from the lower end of the pipe and returning to the original position, by use of an electric motor, axles, and cog-wheels, thus providing means for dumping ashes from grate area by use of electric current,
f. locating a source of combustible gas with conduit means for supplyiny combustible gas to the firebox areea, control means in the conduit for releasing the gas, and ignition means for igniting the gas at the grate,
g. locating a thermostat on the outer wall of the pipe for sensing the temperature thereof and controlling the ignition,
h. attaching the lower end of a selected size vertical positioned metal pipe, with capped upper end, to the larger end of a metal bell reducer and attaching the smaller end of the bell reducer to the upper end of said firebox pipe protruding out of the top of the air tight box, said size to contain sufficient air volume to offer good combustion of the fixed amount of fuel to be burned per hour,
i. installing a feed pipe connecting the fuel storage area to the firebox area with means of delivering said fuel to the firebox by use of auger powered by a variable speed electric motor,
j. installing at least two exhaust air pipes, with capped upper ends, positioned vertically and parallel to the vertical pipe, connecting the vertical pipe and the exhaust air pipes in series with connecting pipe sections, being semi-vertical, and inserting the lower end of each vertical exhaust air pipe into the top of an air tight box, having a side door for servicing, to provide the furnace with soot and fly ash traps,

k. locating a forced draft fan at the box most remote from the combustion chamber with means of delivering its output into the air tight box containing the grate, said means containing an electric air heater, which is controlled by the electric circuit controlling the gas ignition system,

l. installing an air heater positioned near the box most remote from the combustion chamber, having connecting means for allowing furnace hot exhaust air to pass up through said air heater and heat the many horizonal parallel tubes that are suspended through said heater with said tubes providing connecting means with draft fan allowing outside air a passage way through the air heater and through draft fan into air tight box containing grate, thus providing heated draft air for furnace,

m. installing at least one air washing chamber having connecting means with air heater, or furnace exhaust, to allow furnace exhaust air to pass through said washing chamber and exit outside through exhaust means that contain an inducted draft fan, said washing chamber having a water reservoir, a water float valve, a circulating water pump with filters and connecting means with a water spray head located at its inside top and an outside water supply pipe coiled through its reservoir, all providing a system for washing the furnace exhaust air,

n. installing at least one water storage tank near the top of the furnace exhaust air pipes with outside water supplied through connecting means with pipe coils located in the reservoir of the air washing chamber,

o. locating water heat pipes against the furnace vertical pipe and exhaust air pipes with means of circulating water from the bottom of the storage tank through said heat pipes and back into the top of the storage tank, thus providing means of delivering furnace heat into said water tank,

p. covering the water heat pipes with gravel and holding said gravel in place by means of hardware cloth and surrounding each vertical section with a layer of insulation,

q. installing a water discharge pipe in the water storage tank for consumer connection means,

r. installing at least one hot water thermostat and control timer positioned to furnish means of operating the furnace unit automatically,

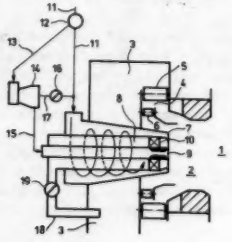
s. placing an insulated cover over said furnace unit with appropriate servicing doors and utility connection means.

4,702,180

PULVERIZED COAL BURNER DEVICE

Takashi Kiga, Yokohama, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

Filed Mar. 24, 1987, Ser. No. 29,722
Claims priority, application Japan, Apr. 4, 1986, 61-77741
Int. Cl.[4] F23D *1/00*
U.S. Cl. 110—263 **4 Claims**



1. A pulverized coal burner device comprising

a pulverized coal burner extending through a wall of a furnace and having a low-load pulverized coal nozzle, a tertiary air passage which surrounds said low-load pulverized coal nozzle and a high-load pulverized coal nozzle which surrounds said tertiary air passage,

a line for supplying the pulverized coal to said high-load pulverized coal nozzle when a density of pulverized coal entrained in a primary air from a mill is high,

separation means connected to said line for separating the pulverized coal and the primary air supplied through said line when the density of the pulverized coal in the primary air is low, thereby increasing the density of the pulverized coal,

a line for supplying the air thus having the pulverized coal with the increased density to said low-load pulverized coal nozzle,

a line for supplying tertiary air to said tertiary air passage, and

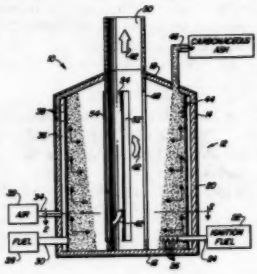
a line for supplying to said high load pulverized coal nozzle the separated air containing a slight quantity of pulverized coal from said separation means.

4,702,181

CYCLONE SEPARATOR

Melvin H. Brown, Allegheny Township, Westmoreland County, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 24, 1986, Ser. No. 934,424
Int. Cl.[4] F23D *1/02*
U.S. Cl. 110—264 **19 Claims**



3. A cyclone separator comprising:

(a) a combustion chamber having a cylindrical member closed off by an upper end wall;

(b) a fuel inlet tangentially formed in a lower portion of said combustion chamber through which a pressurized stream of carbonaceous material is fed;

(c) an air inlet tangentially formed in a lower portion of said combustion chamber above and at an inclined angle to said fuel inlet through which a pressurized stream of hot air is fed, said air combining with said fuel to form a mixture which is circulated at a high velocity in an upwardly extending spiral path to promote burning of said carbonaceous material to produce combustible gas and ash;

(d) an outlet formed in said upper end wall through which said ash is removed; and

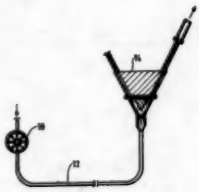
(e) an outlet tube coaxially positioned within said combustion chamber which extends out through said upper end wall, said tube having at least one peripheral opening formed therein which requires an angular turn by said spirally circulating combustible gas in order to enter said tube, said angular turn assisting in separating said combustible gas from said ash whereby essentially ash-free gas exits said combustion chamber through said outlet tube.

4,702,182

PROCESS AND APPARATUS FOR THE INJECTION BY PNEUMATIC MEANS OF METERED AMOUNTS OF PULVERULENT MATERIALS INTO A VESSEL WHICH IS UNDER VARIABLE PRESSURE

Leon Ulveing, Howald; Joseph Linden, Luxembourg, both of Luxembourg; Matthias Bohnet, Brunswick, Fed. Rep. of Germany; Georges Wies, Luxembourg, and Raymond Mack, Colmar-Berg, both of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Aug. 5, 1986, Ser. No. 893,407
Claims priority, application Luxembourg, Aug. 5, 1985, 86.034
Int. Cl.[4] F23D *1/00*
U.S. Cl. 110—347 29 Claims



1. A process for the injection by pneumatic means of metered amounts of pulverulent materials at different injection points into a vessel which is under variable pressure including the steps of:

forming a pneumatic mixture in metering means;

delivering said formed pneumatic mixture through a common primary pipe to a distribution head;

imparting a supercritical speed to said pneumatic mixture in said distribution head wherein a pneumatic mixture is formed which has a relatively high content of pulverulent material in the propulsion air; and

dividing said pneumatic mixture into secondary currents which are delivered respectively to a plurality of injection points.

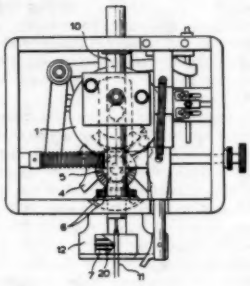
4,702,183

LOCKSTITCH SEWING MACHINE

Michael J. Greasley, Countesthorpe, and Richard J. Manning, Tugby, both of Great Britain, assignors to Standard Machinery Limited, Leicester, England

Filed Jul. 31, 1986, Ser. No. 892,190
Claims priority, application United Kingdom, Jul. 31, 1985, 8519330; Dec. 17, 1985, 8531004
Int. Cl.[4] D05B *15/04, 57/14, 69/14*
U.S. Cl. 112—38 8 Claims

1. In a lockstitch sewing machine, particularly for use as an insole stitcher, having a stitching mechanism arranged for cyclically repeating operation and including a horizontally mounted rotary shuttle, the improvement comprising means for driving the shuttle for intermittent rotation in a constant direction at a cyclically varying angular velocity, said means including control elements operable to enable a complete shuttle rotation to be achieved during one quarter of each



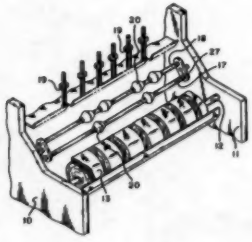
cycle and to have the shuttle remain stationary during the remaining three quarters of each cycle.

4,702,184

QUILTING ALIGNING APPARATUS AND METHOD

Donald I. Datlof, 466 Center St., Collingswood, N.J. 08108

Filed Mar. 31, 1986, Ser. No. 846,361
Int. Cl.[4] D05B *11/00*
U.S. Cl. 112—117 6 Claims



1. In sewing apparatus employing multiple needle heads and two tensioning bars in advance of the needle heads for sewing a base material, the improvement for aligning and/or gathering the material to align the material with the needle heads comprising:

a plurality of crowned members positioned along the tensioning bars in contact with the material.

4,702,185

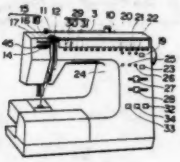
SEWING MACHINE WITH AN AUTOMATIC THREAD TENSION DEVICE

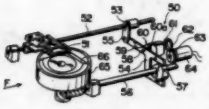
Susumu Hanyu; Nobou Kasuga, both of Tokyo; Kazumasa Hara, Hino, and Mikio Koike, Oume, all of Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1986, Ser. No. 880,004
Claims priority, application Japan, Jun. 28, 1985, 60-140171
Int. Cl.[4] D05B *47/04*
U.S. Cl. 112—254 6 Claims

5. A device for automatically regulating upper and lower thread tension of a zigzag sewing machine that has a machine needle, a loop taker, a bobbin carrier arranged within the loop taker, a bobbin arranged in the bobbin carrier, an upper thread supply, an upper thread extending from the upper thread supply to the machine needle, a lower thread cooperating with the upper thread to form stitches in a fabric to be sewn and being wound around the bobbin and extendable to the fabric from the bobbin, feed dog means for feeding an amount of the fabric with respect to the needle along a fabric feeding direction, a

needle plate with a needle dropping hole elongated transverse of the fabric feeding direction, a plurality of thread guides including means for adjustably tensioning the upper thread and a thread take-up lever, a memory storing data indicative of different thicknesses of fabric to be sewn and pattern data for controlling present and subsequent needle positions and the fabric feeding amount of the feed dog means to form a selected stitch pattern, and pattern selecting means for designating a corresponding one of the pattern data stored in the memory and including pattern selection switches selectively designating a corresponding one of the pattern data stored in the memory, the upper thread adjustable tensioning means including at least two discs receiving the upper thread therebetween, spring means for pressing the disks against each other and for pulling the disks apart, and an upper thread tension actuating member operable in one direction within a predetermined tension adjusting range to actuate the spring means to progressively increase a pressure being applied to the discs until a maximum tension is applied to the upper thread and also operable in a direction opposite the one direction to actuate the spring means to progressively decrease a pressure being applied to the discs until a minimum tension is being applied to the discs, the loop taker being rotatable in a horizontal plane to catch a loop of the upper thread as the needle comes down through the fabric and the needle dropping hole to thereby concatenate the





upper thread with the lower thread to form a stitch in the fabric, the needle being vertically reciprocable and swingable within a maximum range of the elongated needle dropping hole in a plurality of needle positions, the lower thread extending to the fabric from the bobbin along a path of minimum distance when the needle drops at one end position of the maximum range of the elongated needle dropping hole so that a distance of the path progressively increases to a maximum as the needle drops toward an opposite end position of the maximum range of the elongated needle dropping hole, the upper and lower tension regulating device comprising:

means (44) for detecting a present position of the upper thread tension actuating means, said detecting means producing a detection signal indicative of said present position;

means (19) for selectively designating a corresponding one of the pattern data stored in the memory indicative of different thicknesses of the fabric to be sewn;

signalling means (15) responsive to a selected one of the pattern data as selected by the pattern selecting switches and to a designated one of the pattern data as designated by said selectively designating means (19) and to said detection signal for producing an output signal indicative of a direction with which the upper thread tension actuating member is to be moved for tensioning the upper thread to form the stitch;

swingable means (51) for drawing out the lower thread from the bobbin when said swingable means (51) is moved in one direction between the bobbin and the fabric to be sewn;

regulator means (60) angularly positionable and connected to said swingable means (51) for regulating movement of said swingable means (51) and thereby regulating an amount of the lower thread being drawn out from the bobbin; and

actuator means (64) operatively connected to said regulator means (60) for angularly positioning said regulator means (60), said actuating means (64) being responsive to the data indicative of a present position of the needle and a subsequent position of the needle.

4,702,186

SAILBOAT HAVING AT LEAST TWO HULLS

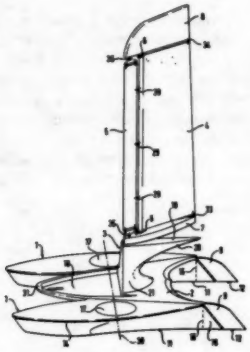
Helge Tiede, Hamburg, Fed. Rep. of Germany, assignor to Firma August Kuhne, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 733,882, May 14, 1985, abandoned. This application Feb. 24, 1987, Ser. No. 18,725

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1984, 3438063

Int. Cl.[4] B63B *1/12*

U.S. Cl. 114—39 **6 Claims**



1. A sailboat having a float body, a mast, and an operating position forward of said mast, comprising:

said float body comprising at least two hulls rigidly connected in spaced relationship and tapering in cross-section from a drop-shaped portion at the bow to a blade-shaped portion astern;

each of said hulls having a lateral area formed by the area of the longitudinal section of the hulls below the immersion level being such that the lateral point of gravity of said sailboat is displaced rearwardly behind the center of said sailboat;

mast fixture means for supporting said mast in the rear half of said sailboat; and

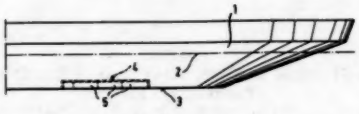
each of said hulls having a height increasing from stem to stern to form an upper boundary edge of said hulls that is inclined upwardly astern such that a lower boundary edge of said hulls extends parallel to the immersion level.

4,702,187

BOTTOM CONSTRUCTION FOR A SHIP

Torsten Heideman; Kai Levander, both of Kauniainen, and Pekka Salmi, Vantaa, all of Finland, assignors to Oy Wartsila Ab, Helsinki, Finland

Filed Mar. 19, 1986, Ser. No. 841,330
Claims priority, application Finland, Apr. 1, 1985, 851312
Int. Cl.[4] B63B *35/08*
U.S. Cl. 114—40 23 Claims



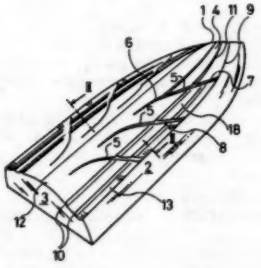
1. A ship that is adapted for operating in ice-filled waters and has a general frame form defining a bottom surface, two side surfaces, a stern and a bow portion that breaks the ice advantageously, said bottom surface being substantially horizontal both longitudinally and transversely of the ship and comprising one or a greater number of cavities, extending to or located on both sides of the longitudinal symmetry plane of the ship, in which cavity or cavities there are arranged movable sheet-like elements having a first position, in which said elements form a generally continuous part of the bottom surface, and a second position, in which said elements form, below the bottom surface, a substantially vertical wedge-shaped structure that converges in the direction from the stern of the hull towards the bow of the hull, said elements being provided with power units which affect said elements to bring about their movement from one position to another, said movement taking place by means of turning around a swivelling axis arranged in the longitudinal direction of said elements.

4,702,188

BOTTOM STRUCTURE OF A BOAT

Eero Harilainen, Pohjoiskaari 8 A 9, SF-00200 Helsinki, Finland

Filed Dec. 4, 1985, Ser. No. 804,686
Claims priority, application Finland, Dec. 13, 1984, 844937
Int. Cl.[4] B63B *1/32*
U.S. Cl. 114—56 6 Claims



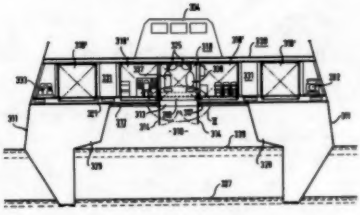
1. A bottom structure for a boat having a bottom surface extending from a central keel line to the sides of the hull of the boat; said bottom surface having between two and four steps spaced in the fore and aft direction of the hull, each of said steps being formed of a pair of edge surfaces positioned symmetrically on the bottom surface with respect to the keel line; said edge surfaces being generally perpendicular to said bottom surface; each of said edge surfaces having a plurality of contiguous portions including a first portion that is adjacent an inner end of said edge surface; said first portion being straight and generally parallel to, but spaced from, said keel line; said edge surface including a second, bent portion that is convexly bent when viewed from the keel and looking toward the sides of the hull, said edge surface including a third portion extending from said bent portion to an outer end of said step; said convexly bent, second portion being bent through a forwardly diverging angle of between 20° to 60° with the keel line of the boat.

4,702,189

MULTIPLE-HULLED MARINE CRAFT

Norbert Schlichthorst, Beckdorf, Fed. Rep. of Germany, assignor to Blohm & Voss AG, Beckdorf, Fed. Rep. of Germany

Filed May 14, 1986, Ser. No. 863,236
Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517863
Int. Cl.[4] B63B *1/00*
U.S. Cl. 114—61 6 Claims



1. A multiple-hulled air cushion marine craft, comprising: at least two floats which extend in the direction of travel of the craft said floats being arranged spaced apart from, and parallel to, one another, and connected together at a top thereof by a connection structure which carries built-in structures and which has, at a bottom thereof a transverse deck disposed above the waterline, at least one closable opening located in the transverse deck and closable in a water-tight and gas-tight manner by a plate arrangement, said opening being rectangular, and its dimensions corresponding to the horizontal cross-section of a container having an open base and which is arranged above the opening in vertical alignment therewith and contains an air-tight chamber, said container being connected at a lower edge thereof via releasable sealing means with support parts of the connection structure.

4,702,190

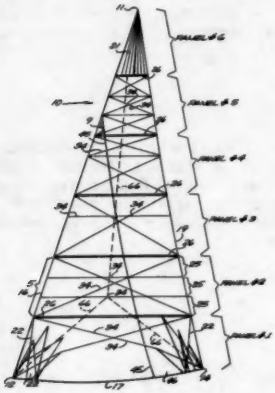
STRUCTURAL SAIL WITH GRID MEMBERS

Peter G. Conrad, Old Lyme, Conn., assignor to Sobstad Sailmakers, Inc., Old Saybrook, Conn.

Continuation-in-part of Ser. No. 681,933, Dec. 14, 1984, Pat. No. 4,593,639, and a continuation-in-part of Ser. No. 722,268, Apr. 11, 1985, and a continuation-in-part of Ser. No. 791,776, Oct. 28, 1985, Pat. No. 4,624,205. This application Dec. 14, 1985, Ser. No. 809,160
The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.
Int. Cl.[4] B63H *9/06*
U.S. Cl. 114—103 10 Claims

1. As an article of manufacture, a sail, wherein the same comprises a continuous skin member a plurality of panels, including a plurality of corners for said sail; a plurality of pliant grid members in strip form across said panels adheringly and integrally attached to said skin member, said grid members integrally interconnecting with grid members of at least one adjoining panel, said grid members defining a latticework pattern on said skin member, said latticework interconnect-

ingly adjoining a latticework on an adjacent panel, said rid members in said latticework pattern interlockingly bearing a



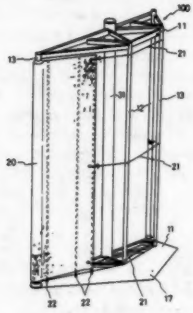
part of a load exerted on said sail and running substantially from luff to leech or from leech to luff.

4,702,191

SAIL DEVICE

Hirokazu Minami; Nobuhiko Ishizu, and Matsuo Ota, all of Osaka, Japan, assignors to Taiyo Kogyo Co., Ltd., Osaka, Japan

Filed Apr. 17, 1986, Ser. No. 853,260
Claims priority, application Japan, Jun. 27, 1985, 60-97816
Int. Cl.[4] B63H *9/00*
U.S. Cl. 114—106 **3 Claims**



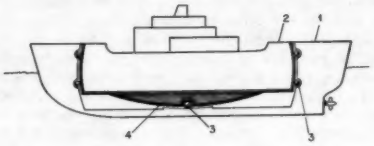
1. A sail device comprising:
a vertical beam mast;
a pair of upper and lower first horizontal beam members fixed at said mast with a certain interval therebetween, said first horizontal beam members being substantially straight;
a pair of upper and lower second horizontal beam members each fixed to each first horizontal beam member at both ends thereof, each second horizontal beam member being composed of a plurality of straight beams in a manner such that said first upper and lower horizontal beam members and said second upper and lower horizontal beam members form substantially a pair of opposing upper and lower trapezoid shape beam structures;
a pair of supporting pillars rotatably fixed between both ends of said upper and lower horizontal beam members and perpendicularly thereto, each pillar being provided with a gear box;
a plurality of vertical holding pillars provided between said upper and lower second horizontal beam members; and
a sail reeled and pulled up around one of said supporting pillars at one end of the sail thereof and having a winding member at another end of the sail thereof, said winding member being reeled and pulled up by the other supporting pillar, wherein said sail and winding member can be extended over the outside of said plurality of vertical holding pillars.

4,702,192

VESSEL SUCH AS SHIP, BOAT AND THE LIKE WITH STABILIZING MEANS

Kemal Butka, 372 Central Park W., Apt. 20J, New York, N.Y. 10025

Filed Jun. 10, 1986, Ser. No. 872,672
Int. Cl.[4] B63B *39/02*
U.S. Cl. 114—122 **12 Claims**



1. A vessel, such as a ship, a boat and the like, comprising an elongated inner hull having a longitudinal horizontal axis and a transverse horizontal axis; an elongated outer hull surrounding said inner hull and arranged movable relative to the latter about both said horizontal axes; and a plurality of ball bodies arranged between said elongated inner hull and said elongated outer hull so as to allow the movement of said elongated outer hull relative to said elongated inner hull about both said horizontal axes, said elongated inner hull and said elongated outer hull being arranged relative to one another so that therebetween a space is formed which allows the movement of said elongated inner hull relative said elongated outer hull about said transverse horizontal axis, with said elongated inner hull moving in said space.

4,702,193

COLLAPSIBLE BOAT

Michael P. Jones, R.R. #2, Clarksburg, Ontario, Canada N0H 1J0, and Paul M. Hahn, Ravenna, Ontario, Canada N0H 2E0

Filed Jun. 26, 1986, Ser. No. 878,655
Claims priority, application Canada, Jun. 27, 1985, 485534
Int. Cl.[4] B63B *7/00*
U.S. Cl. 114—354 **30 Claims**

1. A collapsible boat comprising:
a flexible water-tight hull-and-deck skin including a deckside cockpit aperture;
a bow and forward frame means for insertion through said aperture toward the bow of said hull-and-deck skin;
a transom and aft frame means for insertion through said aperture toward the stern of said hull-and-deck skin;
a central tensioning means for insertion through said aperture, said tensioning means cooperating with said bow and forward frame means and said transom and aft frame means so as to simultaneously urge said bow and forward frame means forward and said transom and aft means aft to thereby stretch and tension said hull-and-deck skin; and
a rigid case assembly for insertion into said aperture and cooperating with said bow and forward frame means, said transom and aft frame means, said tensioning means and said hull-and-deck skin, said case forming a cockpit for

said boat, wherein at least said hull-and-deck skin, said bow and forward frame means, said transom and aft frame

means and said central tensioning means disassemble and fit witin said rigid case for storage and transport.

4,702,194

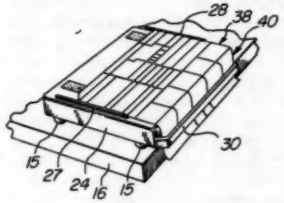
FINGERPRINT CARD HOLDER

Timothy S. Martin, Los Angeles, and Douglas C. Arndt, Thousand Oaks, both of Calif., assignors to Identicator Corp., San Bruno, Calif.

Filed May 23, 1986, Ser. No. 866,358

Int. Cl.[4] B05C *13/02;* **B41K** *1/00*

U.S. Cl. 118—31.5 **1 Claim**



1. A fingerprint card holder which comprises:

a body member adapted to rest on a flat surface and defining a flat support surface on the top thereof, a front wall, a back wall, and a pair of parallel side walls extending downwardly from the top surface, the body member further defining a pair of upstanding side guide rails extending parallel to the side walls and spaced apart to accommodate a fingerprint card therebetween, the support surface and the side guide rails being arranged to allow the card to be placed on the support surface from a position above said surface;

an elongated front guide member secured to the body member and defining a guide surface extending parallel to the front wall of the body member and spaced therefrom to accommodate a fingerprint card inserted between the front wall and the guide surface, the front guide member including at least two spaced studs extending from the central portion of the guide surface toward the front wall of the body member, the center portion of the guide member being biased toward the front wall so that a card inserted between the guide surface and the front wall of the body member will be held against the front wall by the studs while the portion of the card extendign above the support surface is being bent backwardly to lie flat against the support surface; and

a strip of adhesive extending along the support surface of the body member in a direction perpendicular to the front wall and adjacent each side guide rail, the adhesive material having a high adhesive strength on the side engaging the support surface and a low adhesive strength on the other side releasably holding the card flat against the support surface.

4,702,195

DEVICE FOR CLEANING THE GAS NOZZLE OF A WELDING TORCH

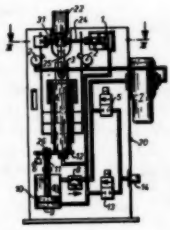
Friedolin Thielmann, Fliederstrasse 9, 6342 Haiger 9/OT Rodenbach, Fed. Rep. of Germany

Filed Feb. 11, 1986, Ser. No. 862,230

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1984, 3421885

Int. Cl.[4] B05C *11/00;* **B05B** *15/02;* **B23D** *79/02*

U.S. Cl. 118—72 **9 Claims**



1. A device for cleaning the gas nozzle of a welding torch in which weld splatters have accumulated on the nozzle, comprising a housing (20) having a top and a side and there being an access opening (21) for a gas nozzle on said top and side, a pair of spaced stops (31,32) within said housing and against which a gas nozzle inserted through said access opening is positioned, a piston (24) movable against said positioned nozzle to secure said gas nozzle in position against said stops, rotatable cutting blades (25) axially movable into and out of said positioned gas nozzle to scrape weld splatters therefrom, and a pair of spraying nozzles (2) on both sides of said positioned gas nozzle below said stops and inclined towards said gas nozzle to spray an anti-adhesive agent thereon when said gas nozzle is secured in its said position so that said gas nozzle remains in the same position for both scraping of weld splatter and spraying of anti-adhesive agent.

4,702,196

COATING DEVICE

Franz Kratzberger, Heidenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Fed. Rep. of Germany

Filed Feb. 20, 1986, Ser. No. 831,936

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 3505769

Int. Cl.[4] B05C *5/02*

U.S. Cl. 118—410 **11 Claims**

1. A coating device for a travelling web, comprising:

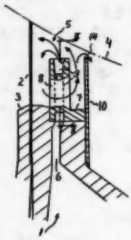
a housing shaped for defining an exit mouth facing toward the web travelling past the mouth, and the mouth being spaced from the travelling web; the mouth being shaped for feeding coating composition toward the web;

a doctor element supported downstream of the mouth and in the path of the web and extending toward the web;

an application space for the coating composition being defined between the exit mouth, the doctor element and the web; a flow body in the application space, spaced upstream from the doctor element, located above the mouth, extending toward the web and spaced from the web, the flow body being shaped for conducting the coating composition, which is being fed from the mouth into the application space, around an axis across the web and across the

application space and that axis defines a center of rotation of the coating composition;

arrayed in the direction across the web, the flow body having feed channels for the coating composition which extend from the mouth across the flow body to open into the



application space, and also arrayed in the direction across the web, the flow body having passage openings across the flow body for passing the rotary flow of coating composition in the application space, the passage openings being placed to pass the rotary flow in the region of the flow body that is close to the exit mouth.

4,702,197

DEVICE FOR CLEANING A MILKING SYSTEM

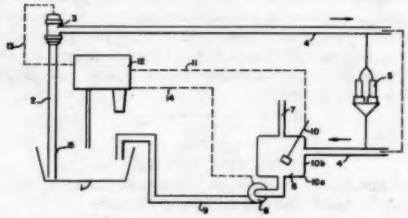
Friedrich Icking, Oelde, and Heinrich Bucker, Langenberg, both of Fed. Rep. of Germany, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Jan. 6, 1986, Ser. No. 816,517

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1985, 3501328

Int. Cl.[4] A01J *7/00*

U.S. Cl. 119—14.18 **2 Claims**



1. In a device for cleaning a milking station, having an air separator comprising a top and a bottom, a rinse reservoir, a suction line that leads from the rinse reservoir to the air separator through the milking station, and a pressure line that leads from the air separator to the rinse reservoir, wherein the top of the air separator communicates with a vacuum line and the bottom of the air separator communicates with the pressure line through a conveyor pump, the improvement comprising:

a remotely controllable shut-off valve in a section of the suction line between the rinse reservoir and the milking station, level sensing means in the air separator and control means connected through a first control line to the shut-off valve and connected through control lines to the conveyor pump and to the level sensing means for turning on the pump and closing the valve when an upper level is sensed in the air separator and for opening the valve and turning off the pump when a lower level is sensed in the air separator.

4,702,198

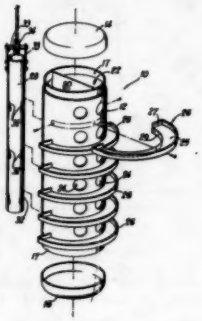
BIRDHOUSE ASSEMBLY

Hugh K. Holyoak, P.O. Box 449, Alapaha, Ga. 31662

Filed Oct. 30, 1985, Ser. No. 792,899

Int. Cl.[4] A01K *31/00*

U.S. Cl. 119—23 **15 Claims**



1. A housing for birds, particularly of the purple martin family comprising:

a hollow tubular enclosure having a molded unitary body and a top and a bottom cap;

a plurality of vertically stacked spaced apart floors situated horizontally and secured in a generally parallel relationship within the enclosure;

at least one planar partition running axially along a radial plane extending between the top and bottom cap and from one inside surface to one diametrically opposed surface and being attached to and intersecting the floors;

a plurality of nesting compartments situated within the enclosure, defined by the floors, a portion of the at least one partition, and the inside surface of the enclosure, each compartment being accessible to the outside via an opening in the side of the enclosure;

a perch for each compartment attached to the enclosure in close proximity to the opening; and

a means for suspending the birdhouse above the ground.

4,702,199

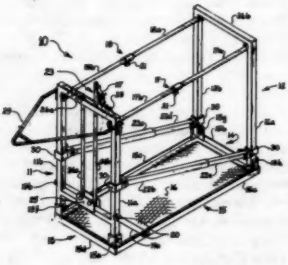
CALF TRIM CHUTE

Jack M. Seal, Rt. 1, Box 1762, Brazoria, Tex. 77422

Filed Oct. 4, 1985, Ser. No. 784,199

Int. Cl.[4] A01K *1/06*

U.S. Cl. 119—99 **5 Claims**



1. A collapsible trim-chute consisting of a base member with a floor, a head frame member with a stall, a tail end frame member, the head frame member and tail end member each

being pivotably mounted on the base member collapsible onto said base and each other, each of said head frame and said tail end member having pivotably mounted near their upper extremes a brace spacer member which matingly engages the brace spacer on the other member thereby to maintain said members in upright and spaced apart position when said trim chute is set-up, an animal side-movement restraining member slidably mounted on each side, said restraining member being capable of adjustable and fixed positioning on the frame and end members on each side, the stall of said head frame being adjustable vise like to receive an animals neck and lockable in pressure against said animals neck.

4,702,200

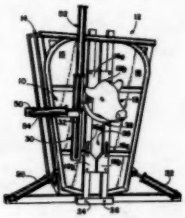
LIVESTOCK HEAD HOLDER

Jack F. Simington, Chiloquin, Oreg., assignor to Simington Products Company, Chiloquin, Oreg.

Filed Apr. 16, 1986, Ser. No. 852,647

Int. Cl.[4] A61D *3/00*

U.S. Cl. 119—99 **2 Claims**



1. A livestock head holder for use on a cattle chute, the chute having a pair of opposed, laterally shiftable doors at an end thereof and a vertical, elongate opening between the doors for allowing, with the doors in a closed position, passage of the head only of an animal restrained in the chute through the opening, the holder comprising:

a head catch for engaging the head of an animal restrained in the chute;

an elongate, tubular guide having a slot in the forward side thereof, mounted on one of the doors of the chute; and

a mounting element slidably received in said guide, a pivot pin carried on said element, said pin projecting through said slot and carrying said head catch pivotably thereon, wherein said head catch is shiftable along said pivot pin for adjusting horizontally the distance between said head catch and the elongate opening of the chute, said element being shiftable along said guide; and,

powered means for shifting said element along said guide, and a bracket carried on said element, said bracket extending through said slot, and another powered means mounted on said bracket for pivoting said head catch.

4,702,201

SOUNDPROOF TYPE ENGINE WORKING MACHINE

Satoshi Odo, Saitama; Tetsuo Iida, Kanagawa; Atsushi Abe, and Makoto Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1986, Ser. No. 915,118

Claims priority, application Japan, Oct. 4, 1985, 60-151518[U]; Oct. 31, 1985, 60-166601[U]; Oct. 31, 1985, 60-166602[U]

Int. Cl.[4] F02B *63/00*

U.S. Cl. 123—2 **5 Claims**

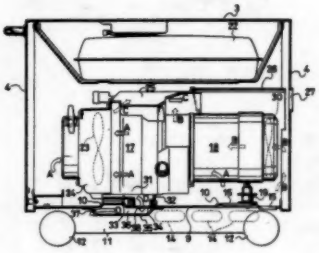
1. A soundproof type engine working machine including an engine and a working machine driven by the engine which are situated one behind another in the rotary shaft direction and enclosed within a soundproof casing including:

a main air inlet port formed in a bottom portion of said soundproof casing and at the side where said working machine is situated;

a working machine cooling fan mounted to said working machine;

an engine cooling fan mounted to said engine;

a duct covering a cylinder portion and an exhaust muffler of



said engine and opened up outside of said soundproof casing at an end portion thereof;

a fan cover covering said engine cooling fan and communicating with said duct;

means for introducing a cooling air produced by said working machine cooling fan to said duct after cooling said working machine; and

an oil pan cooling air passage disposed along an oil pan portion of said engine, communicated with said fan cover and opened up at an outer portion of said soundproof cover after penetrating through a bottom portion of said soundproof cover.

4,702,202

LOW PROFILE INTERNALLY PACKAGED FUEL INJECTION SYSTEM FOR TWO CYCLE ENGINE

Robert J. Hensel, Oshkosh; James L. Wagner, Neenah; James M. Hundertmark; Stephen E. Sheridan, both of Fond du Lac, and David W. Heidel, Green Lake, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

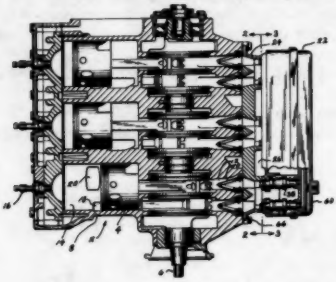
Filed Aug. 26, 1986, Ser. No. 900,595

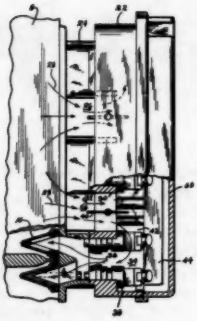
Int. Cl.[4] F02B *33/04*

U.S. Cl. 123—52 M **19 Claims**

1. In a two cycle internal combustion engine having a reciprocal piston connected to a crankshaft in a crankcase, fuel supply means comprising fuel injection means, and a low profile intake manifold mounted to said crankcase and defining

passage means for intake air flowing in a first direction adjacent said crankcase and then flowing in a second direction





away from said crankcase and then flowing in a third direction into said crankcase.

4,702,203

INTAKE MEANS OF INTERNAL COMBUSTION ENGINE

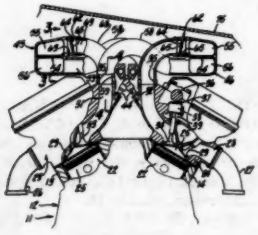
Masatoshi Ohmi, Iwata; Toshihiko Yoneda, Shizuoka, and Kazuo Uchiyama, Hamamatsu, all of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Division of Ser. No. 634,795, Jul. 26, 1984, Pat. No. 4,649,876. This application Oct. 3, 1986, Ser. No. 914,936

Claims priority, application Japan, Oct. 12, 1983, 58-190253

Int. Cl.[4] F02B *75/18*

U.S. Cl. 123—52 MV **10 Claims**



1. An induction system for an internal combustion engine having a first cylinder, a second cylinder spaced from said first cylinder, first and second intake ports serving each of said cylinders, a first air box lying substantially directly above said first cylinder and spaced from said second cylinder, a second air box lying substantially directly above said second cylinder and spaced from said first cylinder and said first air box, a first conduit extending from said first air box to the first intake port of said first cylinder, a second conduit extending from said second air box to said first intake port of said second cylinder, a third conduit extending from said first air box to the second intake port of said first cylinder, and a fourth conduit extending from said second air box to the second intake port of said second cylinder, two of said conduits having a substantially greater effective length than the other of said conduits.

4,702,204

LUBRICATION OIL PASSAGE ARRANGEMENT FOR WATER-COOLED INTERNAL COMBUSTION ENGINES

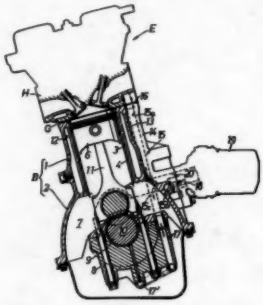
Nobuo Anno, and Takeo Arai, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabuhiki Kaisha, Tokyo, Japan

Filed Dec. 12, 1985, Ser. No. 808,161

Claims priority, application Japan, Dec. 14, 1984, 59-263891

Int. Cl.[4] F01M *1/00*

U.S. Cl. 123—196 AB **6 Claims**



1. A lubricating oil passage arrangement for a water-cooled internal combustion engine including a cylinder block having a side wall, a plurality of cylinder bores in said cylinder block, a water jacket surrounding said cylinder bores, and a crankshaft rotatably supported in said cylinder block, said lubricating oil passage arrangement comprising:

a portion of said cylinder block side wall adjacent said water jacket bulging laterally outwardly therefrom,

a first passage within said side wall portion extending substantially parallel to an axis of one of said cylinder bores adjacent one side of said water jacket,

a second passage extending substantially parallel to said crankshaft and a third passage communicating between said first and second passages, and

said second and third passages beng disposed closely subjacent said water jacket.

4,702,205

EXTERNAL COMBUSTION VANE ENGINE WITH CONFORMABLE VANES

Constant V. David, 4952 Field St., San Diego, Calif. 92110

Continuation-in-part of Ser. No. 789,451, Oct. 21, 1985, Pat. No. 4,653,274, which is a continuation-in-part of Ser. No. 586,812, Mar. 6, 1984, Pat. No. 4,561,252. This application May 27, 1986, Ser. No. 866,944

Int. Cl.[4] F02B *71/04*

U.S. Cl. 123—236 **15 Claims**

1. An external combustion vane engine, comprising:

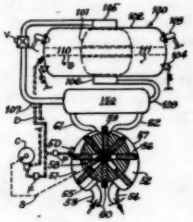
means for compressing air and expanding combusted gas;

a shaft connecting the compressing and expanding means for delivering power by means of an external drive shaft;

means for receiving compressed air from the compressing and expanding means, mixing a fuel with the compressed

air, igniting the mixture to produce combusted gas, and delivering the combusted gas to the compressing and expanding means,

the compressing and expanding means including a plurality of generally cylindrical center bodies, a plurality of generally cylindrical fixed hollow external structures surrounding and enclosing the center bodies, flange means for support of the center bodies by the fixed hollow external structures for relative rotation therebetween about the shaft axis, each one set of center body and associated hollow external structure being positioned between two adjacent flanges, the external hollow structures and the center bodies having continuously curved surfaces positioned to face each other, a plurality of vane means extending between each one of two adjacent flanges at a plurality of circumferentially spaced locations from an outer facing surface of the center body to an associated inner facing surface of the external hollow structure to thereby define a plurality of substantially circumferentially spaced sealed spaces between the flanges and the two associated circumferential facing surfaces, each one of the vane means comprising a rigid curved vane structure having four sides and two generally parallel curved faces, two opposite sides being enabled to slide on associated flat surfaces of the flange means, one first side of the other two opposite sides being enabled to slide on the inner facing surface of the associated external hollow structure and the second side of the other two opposite sides being articulated by means of a cylindrical axle mounted in an associated lodging located on the outer



surface of the associated center body, the radii of curvature of the vane curved faces being equal to the corresponding to radii defining the center body outer surface, the vane first sliding side being constantly urged to follow the external hollow structure inner surface thus making the vane means conformable to the shapes imposed on the sealed spaces, the curvatures and relative positions of the facing circumferential surfaces being such that some of the sealed spaces progressively decrease in volume whilst the balance of said sealed spaces progressively increase in volume as relative rotation of the facing surfaces takes place, an air inlet at the location where the decreasing volume is largest, an air outlet at the location where the decreasing volume is smallest, a combusted gas inlet at the location where the increasing volume is smallest and a combusted gas outlet at the location where the increasing volume is largest;

spline means for slideably mounting the center bodies on the connecting shaft and drive shaft assembly;

means for supplying air at high pressure to a plurality of air cushion bearings located between associated sliding surfaces;

means for applying the air pressure in a preferential direction on the two bearing surfaces in a manner such that any decrease in the distance separating the bearing two surfaces causes an increase of the air pressure, thereby generating a restoring force that constantly and continuously opposes said distance decrease and maintains the two bearing surfaces at a preset separation distance in cooperation with an opposing bearing air cushion;

means for generating a self-regulating response of the air pressure variations to separation distance variations;

means for forming said air cushion bearings between the shaft and the associated supporting flange means;

means for forming said air cushion bearings between each one of the two sides of each central body and the corresponding surface of the associated flange means;

means for forming said air cushion bearings between each one of the two sliding sides of the vanes and their associated flange means surfaces;

means for forming said air cushion bearings between the surfaces of each vane cylindrical axle and its associated lodging;

means for ducting high pressure air to the air cushion bearings formed between said axle and lodging;

a rest pad mounted on each one of the second one of the vane opposing sides which follows the hollow external structure inner surface and articulated so as to constantly face said inner surface, said rest pad including a hinge articulation extending substantially the length of said vane side for enabling the pad to oscillate freely about said articulation for conformance with the shape of said inner surface, means for forming an air cushion bearing in cooperation with said inner surface, means for supplying said air cushion bearing with high pressure air, means for closing the ends of the air cushion bearing with face the cooperating surfaces of the flange means, means for causing the pressure existing in the air cushion bearing to vary in the inverse ratio of the distance separating the pad from said inner surface, whereby (1) the outwardly directed forces exerted on the vane second side are balanced by the forces developed by the pressure existing inside the pad air cushion bearing, (2) solid friction between said vane side and said inner surface is substantially prevented, and (3) friction is limited to that of the hinge articulation.

4,702,206

ROTARY POSITIVE DISPLACEMENT MACHINE

John Harries, Flat 15, 30 Oaklands Rd., Bromley, Kent, BR1 3SL, Great Britain

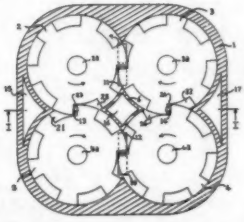
PCT No. PCT/GB85/00322, § 371 Date Mar. 5, 1986, § 102(e) Date Mar. 5, 1986, PCT Pub. No. WO86/00957, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 18, 1985, Ser. No. 852,308

Claims priority, application United Kingdom, Jul. 19, 1984, 8418373

Int. Cl.⁴ F02B *53/00*

U.S. Cl. 123—246 **8 Claims**



1. A rotary internal combustion engine comprising

a casing with intersecting rotor compartments,

rotors able to rotate in said compartments and turning about axles which are supported by the casing, each said rotor being in the shape of a disc with abutments or lobes defined between alternating tips and roots with respective outer and inner radii,

gearing on the axles controlling said rotors to rotate without contact of respective interleaving lobes in such a way that interior surfaces of said casing and opposing tips and roots of first alternating adjacent pairs of said rotors define a

transfer volume between separated compression and expansion regions on respective sides of a plane through axes of said rotors of each said first adjacent pair,

apertures in the casing to permit output and input of working fluid or gases from and to said compression and expansion regions under the action of the other adjacent interacting rotor pairs, each said first alternating adjacent pair of interleaving rotors providing a periodic transfer of a respective volume of the fluid or gas between the respective compression region via the transfer volume to the respective expansion region, and

means for igniting the working fluid or gas in said transfer volume between the respective compression and expansion regions,

wherein the peripheral length of each said tip is shorter than the respective peripheral length of each opposing root, said transfer volume is defined to extend between respective opposing sides of said abutments or lobes of the respective first interleaving rotor pair when said interleaving lobes are equally spaced from said plane of the respective first rotor pair, respective opposing tips and roots of each said first rotor pair have a point of closest contact in said plane thereof, and each said transfer volume contains a part of the working fluid or gas from the respective compression region that is sectioned off as a result of the respective interleaving rotors, which part expands into the respective expansion region, as the rotor rotates.

4,702,207

INTAKE ARRANGEMENT FOR INTERNAL COMBUSTION ENGINE

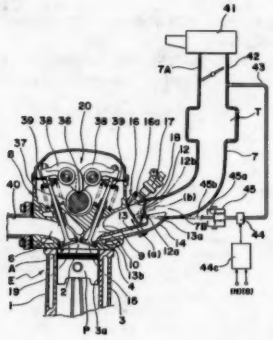
Koichi Hatamura, and Koji Asanomi, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Continuation of Ser. No. 653,766, Sep. 24, 1984, abandoned. This application Dec. 27, 1985, Ser. No. 815,288

Claims priority, application Japan, Sep. 24, 1983, 58-176776; Oct. 28, 1983, 58-202047

Int. Cl.[4] F02B *3/00*

U.S. Cl. 123—302 **16 Claims**



1. An intake arrangement for an internal combustion engine, comprising first and second intake ports for supplying intake gases, said first and second intake ports respectively open into a combustion chamber of the internal combustion engine, said combustion chamber including a cylinder having an axial and a lateral direction, and intake valves disposed in the respective intake ports, a main intake passage in communication with said intake ports for supplying said intake gases to said combustion chamber, said main intake passage having a lower lower portion curved to a large extent in the axial direction in the vicinity of said ports, a shutter valve means provided in said main intake passage, said shutter valve means being adapted to be held in a closed state when intake air amount is small and to be opened when the intake air amount is increased for control to increase or decrease passage area of said main intake passage according to the engine operating conditions, a throttle valve in said main intake passage upstream of said shutter valve with respect to the direction of flow of gases towards the combustion chamber, and means for causing a swirling flow of gases in a circumferential direction of said combustion chamber comprising a single auxiliary intake passage having an upstream end opening into the main intake passage at a location upstream of the shutter valve means and downstream of said throttle valve, and also having a downstream end opening only adjacent the first intake port, the downstream end being displaced relative to the center of the combustion chamber, said auxiliary intake passage being formed so as to be directionally below said main intake passage from the upstream end to the downstream end of the auxiliary intake passage, the upstream end and the downstream end being continuously smoothly connected so that the auxiliary passage is curved to be adjacent a peripheral edge of the cylinder, a longitudinal cross-section of the auxiliary intake passage between the upstream end and the downstream end being a substantially straight line, a portion of said auxiliary intake passage adjacent said combustion chamber intersecting the curved portion of said main intake passage adjacent said first intake port.

4,702,208

DEVICE FOR ELECTRICAL ACTUATION OF THE ACCELERATOR OF AN INTERNAL COMBUSTION ENGINE

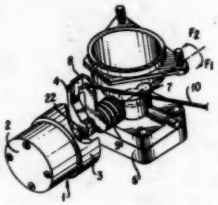
Claude Lombard, Le Chesnay; Jean-Paul Brisset, Thiais; Jean-Luc Marais, Nanterre, and Gérard Catier, Issy Les Moulineaux, all of France, assignors to Regie Nationale des Usines Renault, Boulogne Billancourt, France

Filed Feb. 25, 1986, Ser. No. 833,173

Claims priority, application France, Feb. 25, 1985, 85 02670

Int. Cl.[4] F02D *33/00*

U.S. Cl. 123—339 **9 Claims**



1. Device for electrical actuation of the accelerator of an internal combustion engine, particularly a motor vehicle, comprising a reduction gear, interposed between an electric motor and an actuation element, an element for controlling the accelerator, means for returning this control element to an idle position, and an electric contact switch that makes it possible to detect if the actuation element is effectively controlling the control element or if the control element is placed under the direct control of the driver of the vehicle acting mechanically on an accelerator lever or pedal, wherein the reduction gear comprises a planetary gear train whose sun gear (**12**) is solid in rotation with the shaft (**23**) of the electric motor (**2**) and whose internal ring gear (**11**) is connected mechanically to the actuation element (**4**) while the planet carrier (**14**) is mounted to oscillate between two positions and, on the one hand, is pulled elastically by a return spring (**15, 37**) toward a first position in which it places the electric contact switch (**17, 47**) in a first state and, on the other hand, is placed in a second position in which it places the electric contact switch (**17, 47**) in a second state, in opposition to the return spring (**15, 37**), under the action of the return means (**9**) of the control element (**8**) when the control element (**8**) is controlled by the actuation element (**4**).

4,702,209

DEVICE FOR ADJUSTING THE IDLING RPM

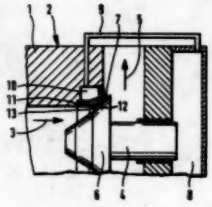
Andreas Sausner, and Peter Volz, both of Frankfurt am Main, Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 27, 1985, Ser. No. 781,450

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1984, 3435701

Int. Cl.[4] F02M *23/04*

U.S. Cl. 123—339 4 Claims



2. A device for regulating the idling rpm of an internal combustion engine having an intake pipe with a throttle valve therein, which throttle valve is actuatable as desired, there being a bypass disposed around the throttle valve, and wherein the bypass has a bypass valve which is controllable as a function of operating parameters of the internal combustion engine, said bypass valve having a valve element, said valve element being displaceable relative to a valve seat by an electromagnet in order to regulate the size of a passage cross section, the improvement wherein said device further comprises

a back-pressure chamber, the valve element having a pressure-equalization surface located in the back-pressure chamber, wherein a pressure-equalization connection from the back-pressure chamber leads to the upstream side of the valve element, said back-pressure chamber communicating solely with the upstream side of said valve element via said pressure-equalization connection to isolate a back-pressure of said chamber from a pressure of said intake pipe downstream of said valve element, and wherein said pressure-equalization connection commences at a narrowest part of a gap between the valve element and the valve seat; and wherein

said valve element is formed with an approximately conical region configured for movement into the valve seat, and said valve seat has a conical widening towards an outlet side.

4,702,210

APPARATUS FOR CONTROLLING IDLING ROTATION NUMBER OF INTERNAL COMBUSTION ENGINE

Akimasa Yasuoka, and Takeo Kiuchi, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 871,738

Claims priority, application Japan, Jun. 28, 1985, 60-141848

Int. Cl.[4] F02D *41/16;* F02M *3/07*

U.S. Cl. 123—339 13 Claims

1. An apparatus for the control of the number of idling rotations of an internal combustion engine provided with a control valve for adjusting an amount of an inspired air to said engine, control valve drive means for driving said control valve, and control means for supplying a control signal to said control valve drive means, said control means comprising:

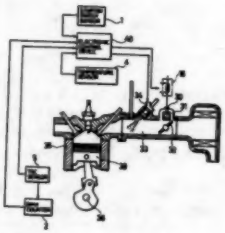
internal combustion engine RPM detecting means for detecting the number of rotations for said internal combustion engine,

cranking discriminating means for determining whether or not said internal combustion engine is in the state of during-cranking,

after-cranking discriminating means operatively connected to said cranking discriminating means for determining whether said internal combustion engine is in an after-cranking state during a predetermined period of time following termination of the during-cranking state, or whether it is in an after-cranking state following elapse of said predetermined period of time,

target RPM memorizing means for storing a target RPM of said internal combustion engine,

deviation detecting means for reading out said target RPM of said target RPM memorizing means after the termination of the cranking state and detecting the deviation of



said detected RPM of said internal combustion engine from said target RPM,

control gain generating means operatively connected to said cranking discriminating means for generating different control gains in response to the determination made by said after-cranking discriminating means, and

control signal output means operatively connected to said deviation detecting means and to said control gain generating means for supplying a control signal in said control gain to said control valve drive means in accordance with said deviation.

4,702,211

IGNITION TIMING CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

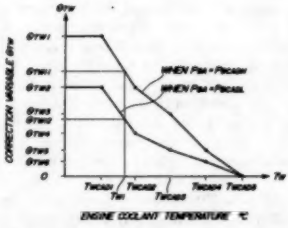
Akira Kato; Hisashi Igarashi, both of Tokyo, and Tadashi Umeda, Asaka, all of Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Jan. 15, 1986, Ser. No. 819,502

Claims priority, application Japan, Jan. 21, 1985, 60-7476

Int. Cl.[4] F02P *5/14, 5/15*

U.S. Cl. 123—421 9 Claims



1. An ignition timing control method for an internal combustion engine, which is adapted to control the timing of ignition of a mixture being supplied to said engine, on the basis of a basic ignition timing value determined as a function of operating parameters of said engine, the method comprising the steps of:

(a) detecting a parameter value indicative of a temperature of said engine;

(b) detecting a parameter value indicative of the magnitude of load on said engine when said parameter value indica-

tive of the temperature of said engine thus detected is lower than a predetermined value;

(c) determining a correction variable based upon said parameter values indicative of the temperature of said engine and the magnitude of load on same thus detected;

(d) correcting said basic ignition timing value by said correction variable thus determined;

(e) effecting ignition of said mixture at a timing according to said basic ignition timing value thus corrected;

(f) detecting the rotational speed of said engine; and

(g) prohibiting execution of said steps (b)-(e) when the rotational speed of said engine thus detected is lower than a predetermined value which is lower than the idling speed of said engine.

4,702,212

ELECTROMAGNETICALLY OPERABLE VALVE

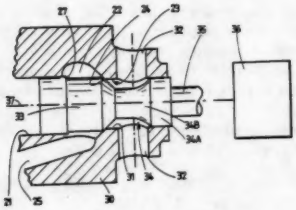
Christopher H. Best, London; David F. Lakin, Gloucester, and Timothy M. Simpkins, Wembley, all of England, assignors to Lucas Industries public limited company, Birmingham, England

Filed Nov. 27, 1985, Ser. No. 802,308

Claims priority, application United Kingdom, Nov. 30, 1984, 8430259

Int. Cl.[4] F16K *31/06*; F02M *51/00*

U.S. Cl. 123—472 **10 Claims**



1. A means for controlling fuel flow to a fuel injection nozzle of a combustion engine comprising a pumping chamber of a high pressure fuel injection pump, the pumping chamber having an outlet communicating therewith and through which fuel flows to the fuel injection nozzle during a pumping stroke of the apparatus, an electromagnetically operable valve for controlling the escape of fuel from said pumping chamber to the fuel injection nozzle, said electromagnetically operable valve comprising a valve housing, a first bore formed in the housing, a valve member slidable in said bore, a chamber into which said valve member extends, an outlet opening formed in the wall of said chamber, a seating defined about said outlet opening, said seating being tapered inwardly in the direction of fuel flow through said outlet from said pumping chamber, whereby a reaction force is applied to the valve member tending to urge the valve member to an open position, said valve member being shaped for co-operation with said seating, an inlet passage communicating with said chamber, said inlet passage in use being connected to said pumping chamber, a solenoid, an armature associated with said solenoid and operatively connected to the valve member and which when the solenoid is energised urges the valve member into engagement with the seating, and a surface defined on the valve member and against which in the open and closed positions of the valve, fuel under pressure in said chamber can act to urge the valve member to the open position said outlet being defined by a further bore formed in said housing, said further bore having a diameter smaller than said first bore, said valve member defining an extension which extends into said further bore, the part of the extension remote from said seating having a working clearance with said further bore, and the portion of the extension intermediate said part and the part of the valve member which co-operates with said seating being of reduced diameter, and an outlet extending from said further bore.

4,702,213

METHOD FOR CONTROLLING AIR/FUEL RATIO

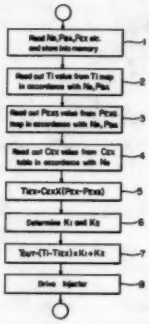
Akimasa Yasuoka, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,501

Claims priority, application Japan, Dec. 25, 1984, 59-271892

Int. Cl.[4] F02M *51/00*

U.S. Cl. 123—480 **8 Claims**



3. A fuel supply controlling method for an internal combustion engine having a supercharger for controlling the amount of fuel to be supplied to the engine according to operating conditions of the engine, which method comprises detecting an engine load, detecting an exhaust gas pressure, determining a basic amount of fuel in a state of normal operation of the engine in accordance with the detected value of engine load, determining a correcting amount of fuel in accordance with the detected value of exhaust gas pressure, correcting said basic amount of fuel with said correcting amount of fuel, and supplying to the engine an amount of fuel determined on the basis of the thus-corrected basic amount of fuel thereby controlling the amount of fuel supplied to the engine.

4,702,214

FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

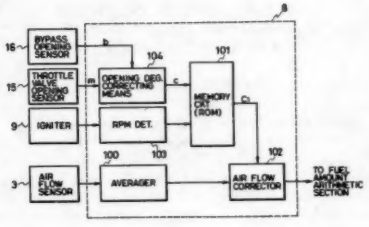
Seiji Wataya, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1986, Ser. No. 914,402

Claims priority, application Japan, Oct. 2, 1985, 60-218139

Int. Cl.[4] F02D *41/18*

U.S. Cl. 123—488 **5 Claims**



1. A fuel injector control apparatus, comprising:

an air-flow sensor for detecting a quantity of suction air supplied to an internal combustion engine;

an injector for injecting fuel into said engine;

a controller for controlling a quantity of said injected fuel responsive to an output of said air-flow sensor;

a throttle valve for regulating a quantity of said suction air;

throttle valve opening detecting means for detecting an opening of said throttle valve;

a bypass valve for said suction air bypassing said throttle valve;

bypass opening detecting means for detecting an opening of said bypass valve;

rotational frequency detecting means for detecting a rotational frequency of said engine; and

first means for correcting said output of said air-flow sensor according to outputs of both said throttle valve opening detecting means and said bypass opening detecting means.

4,702,215

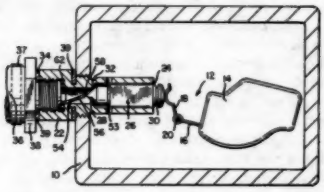
FUEL INLET ASSEMBLY FOR A CARBURETOR

John R. Lebold, Yellow Springs, Ohio, assignor to Vernay Laboratories, Inc., Yellow Springs, Ohio

Continuation of Ser. No. 706,585, Feb. 28, 1985, abandoned. This application Feb. 18, 1987, Ser. No. 16,465

Int. Cl.[4] F02M *5/12*

U.S. Cl. 123—514 **7 Claims**



4. In a motor vehicle fuel system having a tank, a fuel pump including a pump inlet and a pump outlet, a carburetor including a fuel inlet, a first fuel line connecting said pump inlet and said tank, a second fuel line connecting said pump outlet and said carburetor fuel inlet, and a third fuel line connecting said pump outlet and said tank, a first check valve disposed within said third fuel line near said tank for preventing flow from said tank into said third fuel line, said carburetor further including a needle valve disposed within said fuel inlet, the improvement comprising:

a second check valve disposed within said carburetor fuel inlet for preventing vacuum in said second fuel line from reaching said needle valve;

said second check valve including a valve member which is constructed as a single piece from a resilient material; and

said valve member included a pair of lips arranged in a converging relationship to define for said valve member an open end and a normally closed end whereat said lips are disposed adjacent each other to define a normally closed slit therebetween, at least one side wall for connecting said lips, and an annular flange directed outwardly about the open end of said valve member.

4,702,216

SYSTEM FOR REDUCING DISCHARGE OF FUEL VAPOR FROM FUEL TANK TO ATMOSPHERE

Kazumi Haruta, Obu, and Shigeru Yoshida, Toyota, both of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Ohbu, Japan

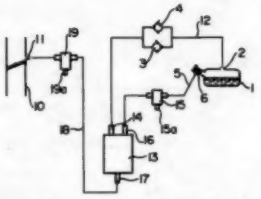
Filed Nov. 7, 1986, Ser. No. 927,722

Claims priority, application Japan, Nov. 8, 1985, 60-172579[U]

Int. Cl.[4] F02M *33/02*

U.S. Cl. 123—520 **1 Claim**

1. A system for reducing discharge of fuel vapor from a fuel tank, comprising a first channel through which fuel vapor passes from a tank fuel vapor outlet port formed in the upper wall of said fuel tank to a canister by way of a check valve, a second channel formed from a refueling opening vapor outlet port of said fuel tank to said canister with a first three-way changeover electromagnetic valve disposed therein, a purge channel formed from a purge port of said canister to a suction system of an engine with a second three-way changeover electromagnetic valve disposed therein, wherein said first electromagnetic value is designed to provide communication between said canister and said channel on the side of said refueling opening vapor outlet port during the shut-down state



of said engine and, during the operation of said engine, close said channel on the side of said refueling opening vapor outlet port while opening said channel on the side of said canister to the atmosphere, and wherein said second three-way changeover electromagnetic valve is designed to open said channel on the side of said canister to the atmosphere during the shut-down state of said engine and provide communication between said channel on the side of said canister and said suction system of said engine during the operation of said engine.

4,702,217

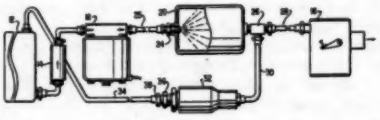
FUEL VAPORIZATION AND PRESSURIZATION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Donald J. Sutherland, 1102-102 Agnes Street, Vancouver, British Columbia, Canada V3L 1E3

Filed Dec. 9, 1986, Ser. No. 939,795

Int. Cl.[4] F02M *17/26*

U.S. Cl. 123—523 **12 Claims**



1. In an internal combustion engine fuel system having a fuel tank from which fuel is supplied to a carburetor for controlled delivery to the engine, the improvement comprising:

(a) a vapour tank for containing pressurized, vapourized fuel;

(b) a nozzle for vapourizing said fuel and for spraying said vapourized fuel under high pressure into said vapour tank;

(c) a high pressure pump for pumping fuel from said fuel tank and for forcing said fuel through said nozzle under high pressure; and,

(d) a fuel delivery line for delivering pressurized, vapourized fuel from said vapour tank to said carburetor.

4,702,218

ENGINE INTAKE SYSTEM HAVING A PRESSURE WAVE SUPERCHARGER

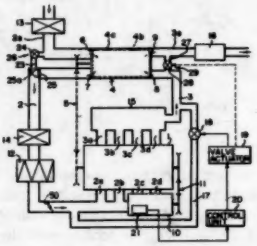
Sadashichi Yoshioka; Tsutomu Matsuoka; Shigeki Hamada, all of Hiroshima, and Humio Hinatase, Aki, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 23, 1985, Ser. No. 757,946

Claims priority, application Japan, Jul. 24, 1984, 59-154599; Jul. 24, 1984, 59-154600; Jul. 24, 1984, 59-112924

Int. Cl.[4] F02B *33/42*

U.S. Cl. 623—559 9 Claims



1. A supercharged diesel cycle engine comprising: an engine, supercharging means including casing means, rotor means rotatably carried in said casing means and having a plurality of axially extending passages, intake air inlet opening means and exhaust gas outlet opening means formed in said casing means at opposite axial ends of the rotor means, intake air outlet opening means and exhaust gas inlet opening means formed in said casing means at opposite axial ends of the rotor means, engine exhaust passage means connected with said exhaust gas inlet opening means and provided with surging chamber means, exhaust gas outlet passage means connected with said exhaust gas outlet opening means, engine supercharged air intake passage means connected with said intake air outlet opening means, engine intake air inlet passage means connected with said intake air inlet opening means, driving means for rotationally driving said rotor means so that intake air drawn into the axially extending passages in the rotor means from said engine intake air inlet passage means through said intake air inlet opening means is compressed by engine exhaust gas drawn into said axially extending passages in the rotor means from said engine exhaust passage means through said exhaust gas inlet opening means and discharged into said supercharged air intake passage means through said intake air outlet opening means, intake bypass passage means bypassing said supercharging means and connecting said intake air inlet passage means with said supercharged air intake passage means, starting valve means provided in said intake bypass passage means at a junction with said supercharged air intake passage means to open said intake bypass passage means and close said supercharged air intake passage means at least in an engine starting period to lead intake air through said intake bypass passage means, recirculation passage means extending between said engine exhaust passage means and said engine supercharged air intake passage means, said recirculation passage means being opened to said engine exhaust passage means downstream from the surging chamber means, and to said supercharged air intake passage means downstream from the junction with the intake bypass passage means, control valve means provided in said recirculation passage means, control means for controlling operation of said control valve means so that said control valve means is opened at least under light load engine operation, intercooler means provided in said supercharged air intake passage means downstream from a portion where said intake bypass passage means is connected with the supercharged air intake passage means and upstream from a portion where said recirculation passage means is opened to said supercharged air intake passage means.

9. A supercharged engine comprising: an engine, supercharging means including casing means, rotor means rotatably carried in said casing means and having a plurality of axially extending passages, intake air inlet opening means and exhaust gas outlet opening means formed in said casing means at opposite axial ends of the rotor means, intake air outlet opening means and exhaust gas inlet opening means formed in said casing means at opposite axial ends of the rotor means, engine exhaust passage means connected with said exhaust gas inlet opening means, exhaust gas outlet passage means connected with said exhaust gas outlet opening means, engine supercharged air intake passage means connected with said intake air outlet opening means, engine intake air inlet passage means connected with said intake air inlet opening means, driving means for rotationally driving said rotor means so that intake air drawn into the axially extending passages in the rotor means from said engine intake air inlet passage means through said intake air inlet opening means is compressed by engine exhaust gas drawn into said axially extending passages in the rotor means from said engine exhaust passage means through said exhaust gas inlet opening means and discharged into said supercharged air intake passage means through said intake air outlet opening means, recirculation passage means extending between said engine exhaust passage means and said engine supercharged air intake passage means, said recirculation passage means positioned downstream from the supercharging means, control valve means provided in said recirculation passage means, control means for controlling operation of said control valve means so that said control valve means is opened at least under light load engine operation, intake bypass passage means for connecting the intake passage means with said intake air inlet opening means, intake bypass valve means provided in said intake bypass passage means, said intake bypass passage means being opened to the engine intake passage means upstream from the recirculation passage means, first air filter means provided in said engine intake air inlet passage means upstream from the intake air inlet opening means and second air filter means provided in said engine intake passage means downstream from the intake air outlet opening means at a position downstream from the intake bypass passage means and upstream from the recirculation passage means, intercooler means provided in said engine intake passage means downstream from the second filter means and upstream from the recirculation passage means.

4,702,219

SUPERCHARGED ENGINE

Tomoo Tadokoro; Haruo Okimoto, and Toshimichi Akagi, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Aug. 27, 1985, Ser. No. 769,662

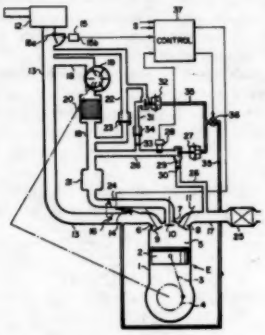
Claims priority, application Japan, Aug. 29, 1984, 59-179655

Int. Cl.[4] F02D *23/00*

U.S. Cl. 123—559 23 Claims

1. A supercharged engine having an intake system and an exhaust system comprising a supercharger disposed in an intake passage of the intake system to pressurize at least a part of the intake air and feed pressurized air to cylinders at least in a first predetermined operating range of the engine, a secondary air passage which is connected to the intake passage downstream of the supercharger at one end and to the exhaust system at the other end and introduces at least a part of the pressurized air at least in a second predetermined operating range of the engine, a secondary air control valve means provided in the secondary air passage to close the secondary air passage at least when the engine operates under heavy load, and a supercharging pressure control means for controlling the supercharging pressure in the intake passage downstream of the supercharger such that the supercharging pressure has a first predetermined pressure when introduction of the secondary air to the exhaust system is effected and the supercharging

pressure has a second predetermined pressure when introduction of the secondary air to the exhaust system is not effected,



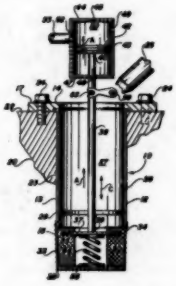
wherein the first predetermined pressure is lower than the second predetermined pressure.

4,702,220

ATOMIZING VALVE APPARATUS FOR INTERNAL COMBUSTION ENGINE

Douglas A. Roe, 124 West Julie, Tempe, Ariz. 85283

Filed Feb. 11, 1987, Ser. No. 13,359
Int. Cl.[4] F02M *29/04*
U.S. Cl. 123—593 **11 Claims**



1. An apparatus for use in combination with the fuel induction system of an internal combustion engine,

which internal combustion engine includes at least one combustion chamber, and

which fuel inducation system includes fuel supply means of providing a fuel mixture of air and liquid and an inlet manifold having an inlet opening for normally receiving said fuel mixture and communicating with said at least one combustion chamber,

a variable vacuum being drawn in said inlet manifold in response to operation of said engine,

and for atomizing the liquid in said mixture and supplying a regulated flow of atomized mixture to said intake manifold in response to engine demand, said valve comprising:

a. a body including a bore having a continuous sidewall and having an inlet end for receiving said fuel mixture and a discharge end communicating with said intake manifold;

b. valve means including a throttle valve residing in the normal path of the fuel mixture exiting the discharge end of said bore;

c. guide means coupling said valve means to said body for reciprocal movement of said throttle valve in extendible and retractable directions relative the discharge end of said base; and

d. biasing means normally urging said throttle valve in the retractable direction,

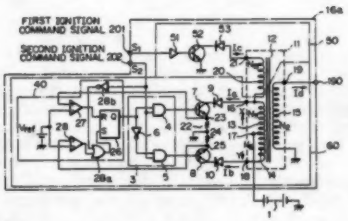
said throttle valve being movable in the extendible direction in response to the vacuum in said manifold.

4,702,221

IGNITION DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Norihito Tokura, Nukata; Hisasi Kawai, Toyohashi; Masahiro Goto, Nukata; Seiji Morino, Okazaki, and Masato Soumiya, Anjo, all of Japan, assignors to Nippon Soken, Inc. and Nippondenso Co., Ltd., both of Aichi, Japan

Filed Oct. 29, 1986, Ser. No. 924,423
Claims priority, application Japan, Oct. 31, 1985, 60-245918
Int. Cl.[4] F02P *3/04*
U.S. Cl. 123—606 **9 Claims**



1. An ignition device for an internal combustion engine comprising:

a direct current power source providing a direct current voltage;

an ignition coil having first, second and third primary coils and a secondary coil;

a first switching element forming a first closed circuit together with the direct current power source and the first primary coil;

a second switching element forming a second closed circuit together with the direct current power source and the second primary coil;

a reverse current-flow preventive element defining a current-flow direction in one direction in the first and second closed circuits;

current detection elements for detecting current-flow in the first and second closed circuits;

a third switching element forming a third closed circuit together with the direct current power source and the first and third primary coils;

an ignition command signal generating means for repeatedly producing at every ignition timing, a first ignition command signal to command turning ON of the third closed circuit, and a second ignition command signal to command turning ON of the first and second closed circuits after a delay of a predetermined time from the timing of the first ignition command signal; and

a control circuit for causing the first and second switching elements to push-pull operate in such a way that when the second ignition command signal is input and a current flow in one side of the first and second closed circuits reaches a predetermined value, a first signal cutting the current flow in one side of the first and second closed circuits is applied to one side of the first and second switching elements, and a second signal starting the other current flow is applied to the other side of the first and second switching elements.

4,702,222

IGNITION SYSTEM FOR MULTI-CYLINDER 4 CYCLE ENGINE

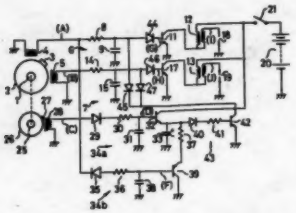
Kosuke Imoto, and Kazutoshi Koyama, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1985, Ser. No. 784,253

Claims priority, application Japan, Oct. 5, 1984, 59-151005[U]; Oct. 6, 1984, 59-210288

Int. Cl.[4] F02P *9/00*

U.S. Cl. 123—643 5 Claims



1. An ignition system for a four cycle "V" type combustion engine having at least two cylinders and comprising

first pulse generating means for generating first and second pulses, the first pulse being generated when a crankshaft of the engine revolves by a first setting angle from a base position and the first pulse including a first half-pulse and a second half-pulse whose polarities are different from each other, and the second pulse being generated when the crankshaft revolves by a second setting angle which is an angle greater than said first setting angle and is a function of the number of cylinders,

second pulse generating means for generating a third pulse each time the crankshaft of the engine revolves twice and at a position that the crankshaft revolves by a third setting angle, said third setting angle being greater than said first setting angle but smaller than the second setting angle,

ignition generating means for providing an ignition signal to at least one of the two cylinders in response to a first half-pulse and to provide an ignition signal to a second cylinder in response to a second pulse,

voltage hold circuit means for developing a first charge state in response to a third pulse and for going to a second charge state in response to a second half-pulse, and

means for prohibiting ignition generation for inhibiting a first half-pulse and second pulse from generating ignition signals depending on the charge/discharge state of said voltage hold circuit means during the period from a third pulse to a second half-pulse.

4,702,223

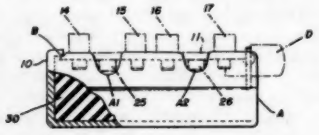
DIAMOND GRINDER ASSEMBLY AND SNAP-FIT MOUNTING MEANS FOR SCARIFIER CASE

Leo Swan, Frederick, Md., assignor to Equipment Development Company, Inc., Frederick, Md.

Filed Apr. 10, 1986, Ser. No. 849,969

Int. Cl.[4] F41F *1/02*

U.S. Cl. 125—3 5 Claims



1. A case for suitable attachment to the rotor disc of a grinder, in combination with an insert grinding assembly, comprising a rectangular flat plate having an outboard side and an inboard side, said plate having quick connection means at each opposite end between the walls of the case and the opposite ends of the said plate, wherein the case wall at one end is formed with an inturned lip coacting with an outboard end of the flat plate to thereby permit engagement under said lip, wherein the improvement, comprises:

a compressible block for positioning within the case to yieldably resist depression of the plate when it is engaged under said lip thereby urging the end to engage upwardly against the underside of said lip, said compressible block being substantially coextensive with the inboard side of said plate; and

a plurality of segments having selected grinding properties secured to the outboard side of said flat plate.

4,702,224

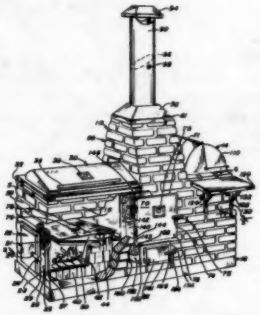
BARBECUE PIT

Dwight E. Griffith, Rte. 1, Welcome, Minn. 56181

Filed Feb. 27, 1987, Ser. No. 19,570

Int. Cl.[4] F24C *15/08*

U.S. Cl. 126—8 3 Claims



1. A barbecue pit comprising a masonry structure including a chimney portion and a fire box portion laterally adjacent to and intercommunicating with the chimney portion, said masonry structure being supported on a concrete base,

(a) said fire box portion having opposing masonry side walls of equal height and an outer end wall opposite the end of said fire box portion intercommunicating with said chimney portion, and including:

(i) a hood frame about the perimeter of the upper edge of said masonry walls of said fire box portion, said hood frame defining the length and width of an access opening into said fire box portion, and a covering hood hingedly mounted to said hood frame,

(ii) a liner of refractory brick extending up said side walls to a height no greater than about three-fourths the height of said side walls and terminating at an upper horizontal ledge below the upper edge of said side walls, and

(iii) a removable metal drip trough structure supported by said upper horizontal ledge, said drip trough structure comprising laterally out-turned horizontal flanges supported on said upper ledge, suspension side walls depending from said flanges, said suspension side walls terminating at the lower extremity thereof along a slope common to each and oriented at an angle of at least about 10° up to about 30° from said horizontal flanges, a generally rectangular drip plate oriented to have the same slope as the lower extremity of said suspension side walls, said drip plate having a main section fixed to the lower extremity of said suspension side walls and a tail extension section projecting from the end of said main section having the greatest dependency from said

horizontal flanges, said tail extension section having upturned extension side walls along the lateral edges thereof as a continuation of said suspension side walls but being free of any out-turned horizontal flanges, said upper edge of said upturned extension side walls of said tail extension section being below said horizontal flanges and having a height at the terminus of said tail extension section no greater than one-third the distance between said horizontal flanges and the juncture between the main section and the tail extension section of said drip plate, a heat shield plate fixedly mounted on spacing pillars depending from the bottom surface of said main section of said drip plate, said heat shield plate having an area dimension approximately equal to said main section of said drip plate, and a drip trough handle member fixedly mounted on the upper surface of said main section of said drip plate for removing said entire metal drip trough structure through said hood frame even though the rectangular drip plate of said drip trough structure is longer than either the width or length of said hood frame access opening,

(b) said chimney portion including an oven therewithin oriented so that the lower horizontal surface of said oven is below the upper horizontal ledge of said refractory brick liner of said fire box portion, an oven door for access into the interior of said oven, and a drip pan door below said oven door, there being no masonry wall obstructing communication between said fire box portion and said chimney portion,

(c) said tail extension section of said drip trough structure being sufficiently long to extend under the lower surface of said oven in spaced relationship thereto and to divide the space under said oven into an upper space and a lower space, and

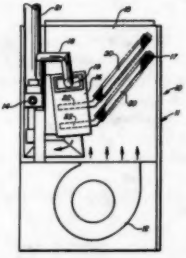
(d) said drip pan door of said chimney portion being such as to allow access into the interior of said chimney portion for placement of a drip pan underneath the tail extension section of said drip trough structure.

4,702,225

CONTROL FOR HEAT PIPE CENTRAL FURNACE

Edward J. Heffernan, Oviedo, Fla., and Ronald S. Tomlinson, Mt. Juliet, Tenn., assignors to Heil-Quaker Corporation, Lavergne, Tenn.

Filed May 14, 1986, Ser. No. 863,147
Int. Cl.[4] F24H *3/00*
U.S. Cl. 126—116 A **9 Claims**



1. In the operation of a heat pipe furnace having a plurality of heat pipes and means for conducting a heated fluid in sequential heat transfer association with the heat pipes, a method of detecting a malfunction of any one of the heat pipes of said plurality comprising:

monitoring the temperature of one of said heat pipes;

preselecting a time window defined by a first point in time and a second, subsequent, point in time following initiation of heat transfer to said plurality of heat pipes and prior to steady state operation of the furnace;

preselecting a threshold temperature; and

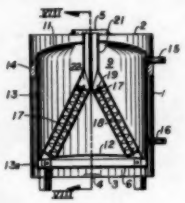
determining whether said monitored temperature is less than the threshold temperature at said first point in time and whether said monitored temperature is greater than the threshold temperature at said second point in time.

4,702,226

HOT WATER TANK WATER PREHEATER

Delwyn J. Shelley, 23 Walker La., Stockton, Calif. 95205

Filed Aug. 8, 1986, Ser. No. 894,555
Int. Cl.[4] F24H *1/00*; F22B *33/00*
U.S. Cl. 126—362 **4 Claims**



1. A preheater for a conventional gas hot water heater comprising in combination:

a. a water reservoir placed above a top surface of the conventional gas hot water heater and exposed to flue gases from an exhaust duct of the gas hot water heater, said water reservoir including a skirt depending from the lower peripheral portion thereof;

b. a pair of conduits in fluid communication with said reservoir allowing the through passage of water so that the water can be first preheated and then admitted to the conventional gas hot water heater;

c. a container circumscribing said reservoir for capturing flue gases from the exhaust duct of the conventional gas hot water heater,

1. said container including an annular side wall, a top wall and a bottom wall, said bottom wall having an opening to snugly accommodate said exhaust gas flue duct of said conventional gas hot water heater, said container further including an outlet in said top wall to allow the passage of exhaust gases therebeyond;

d. a plurality of legs extending from said skirt on said lower portion of said reservoir and passing through leg holes in said bottom wall of said container to rest upon the top surface of the conventional gas hot water heater;

e. and means for increasing the residence time of the flue gases with respect to said reservoir for enhancing the efficiency in extracting heat from the hot exhaust flue gases from the conventional gas hot water heater, said means including:

1. a plurality of pipes adapted to pass hot flue gases through said reservoir and having an auger-type baffle contained therein to increase the residence time of the gas therein, each of said augers being supported on a stem having upper and lower extremities mounted on spiders engaging the interior wall of the respective one of said pipes, said pipes joining to form a manifold having substantially the same cross sectional dimension as the exhaust gas flue duct opening of the conventional gas hot water heater, and

2. a baffle plate interposed between said reservoir and said bottom wall of said container to provide an area having a larger cross section than the opening snugly accommodating the exhaust gas flue duct of the conventional gas hot water heater, thereby diffusing the exhaust gas entering the area and further increasing the residence time about said reservoir, said baffle plate including a plurality of holes circumscribing said plate for the passage of flue gas therebeyond; and,

f. insulation interposed between the upper portions of said reservoir and said container.

4,702,227

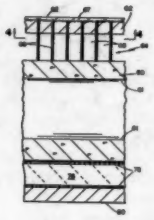
SOLAR ENERGY COLLECTOR AND SYSTEM

John A. McElwain, Calle Fray Luis DeLeon, 4-Entl.°, Palma De Mallorca, Spain

Continuation of Ser. No. 255,899, Apr. 20, 1981, abandoned, which is a continuation of Ser. No. 927,048, Jul. 24, 1978, abandoned. This application Dec. 17, 1985, Ser. No. 810,824

Int. Cl.⁴ F24J *2/26*

U.S. Cl. 126—417 **20 Claims**



1. A solar collector designed to form a portion of the roof or exterior wall of a building, said collector comprising:

an opaque absorber of cementitious clay-containing material defining the exterior surface of said collector, said absorber arranged to form a portion of said roof or exterior wall and to absorb solar energy incident thereupon, said exterior surface being essentially visually a continuation of and indistinguishable from adjacent other portions of said roof or exterior wall;

a longitudainlly-extending fluid flow passage directly behind said absorber, said passage having a fluid inlet and a fluid outlet and providing for fluid flow therein from said inlet to said outlet; and

a plurality of longitudinally-extending transversely spaced metal heat conductors embedded in said absorber, each of said conductors extending rearwardly from within said absorber closely adjacent and behind said exterior surface into said passage and, within said passage, extends generally parallel to a line extending from said inlet to said outlet along the path of fluid flow in said passage,

said collector being free from any transparent cover overlying said absorber whereby solar energy impinges directly on said exterior surface, is conducted by said heat conductors into said passage, and is transferred from said conductors to fluid flowing through said passage.

4,702,228

X-RAY-EMITTING INTERSTITIAL IMPLANTS

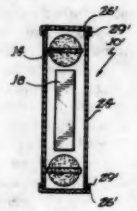
John L. Russell, Jr., Alpharetta, and David N. Coggins, Atlanta, both of Ga., assignors to Theragenics Corporation, Atlanta, Ga.

Filed Jan. 24, 1985, Ser. No. 694,941

Int. Cl.⁴ A61N *5/10*

U.S. Cl. 128—1.2 **9 Claims**

1. A seed for implantation into a tumor within a living body to emit X-ray radiation thereto comprising at least one pellet that contains palladium enriched in palladium-102 to contain many times the amount naturally present, said palladium-102 being activatable by exposure to neutron flux so as to transform a portion of said palladium-102 to an amount of X-ray emitting palladium-103 sufficient to provide a radiation level measured as compensated mCi of greater than 0.5, and a shell of biocompatible material encapsulating said at least one pellet, said



biocompatible material being selected from a material that is penetratable by X-rays in the 20–23 kev range.

4,702,229

ENDOSCOPE WITH A MEASURING DEVICE

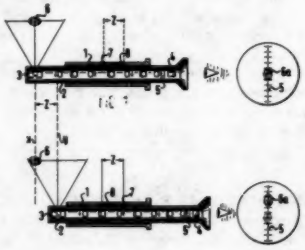
Jürgen Zobel, Bretten-Sprantal, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Knittlingen, Fed. Rep. of Germany

Filed Mar. 26, 1986, Ser. No. 844,191

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1985, 3512602

Int. Cl.⁴ A61B *1/00*

U.S. Cl. 128—4 **6 Claims**



1. In an endoscope for determining the size of an object present in a cavity, said endoscope comprising an optical transmission system with an optical axis, a proximal eyepiece and an objective arranged to view said object laterally to said axis from a distal part of the endoscope, a measuring scale being visible through said eyepiece and being situated in an image plane of said transmission system and means for establishing the distance between said object and said distal part of the endoscope, said distance representing the criterion for calibrating said measuring scale, an improvement comprising said optical transmission system being adjustable to enable a selected part of said object to be viewed laterally by the objective from two different angles at a constant lateral object distance from the endoscope with the distance between the two vertices of said two angles being fixedly preset.

4,702,230

ADAPTER FOR SURGICAL RETRACTOR

Samuel Pelta, Philadelphia, Pa., assignor to Pilling Co., Fort Washington, Pa.

Filed Dec. 8, 1986, Ser. No. 938,880

Int. Cl.⁴ A61B *17/02*

U.S. Cl. 128—20 **11 Claims**

6. A surgical retractor comprising:

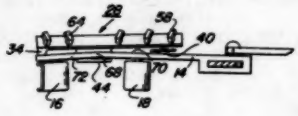
a pair of rigid arms in spaced, substantially parallel relationship to each other, each arm having first blade means supported thereon;

means connected to said arms for holding the same in said

substantially parallel relationship and for adjusting the spacing of said arms; and

at least one auxiliary blade;

wherein the improvement comprises an adapter removably supported on one of said arms, said adapter comprising an elongated bar extending substantially lengthwise along said one arm on one side thereof, means on said bar holding said auxiliary blade, hook means rigidly fixed to the bar at an intermediate position along the length of the bar, said hook means having a first portion engaged with the opposite side of said one arm and an interconnecting portion connecting the first portion to the bar, heel means located substantially at one end of the bar and engaged



with said one side of the arm, and screw means threaded into the bar at a location on the side of the hook means remote from the heal means, said screw means extending from the bar toward said one side of the arm, said screw means having a head engaged with said one side of the arm and a wheel formed thereon, said wheel being located between the bar and the arm and extending radially beyond the bar in at least one direction whereby it can be grasped and rotated manually, said screw being tightened so that the head thereof and said heel means bear tightly against said one side of the arm, and said first portion of the hook means bears tightly against said opposite side of the arm, whereby the adapter is firmly secured to said arm.

4,702,231

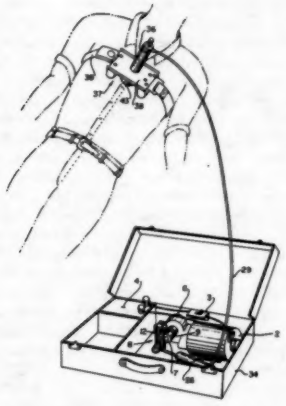
PORTABLE HEART MASSAGE APPARATUS

Pierre P. Arpin, 1347 Highland Ct., Milpitas, Calif. 95035

Filed Oct. 21, 1985, Ser. No. 789,500

Int. Cl.[4] A61H *31/00*

U.S. Cl. 128—28 **2 Claims**



1. A heart massage apparatus for application to a victim whose heart has stopped beating and adapted to impose in a predetermined timed sequence pressure on the sternum of the victim sufficient to periodically compress the chest of the victim to thereby compress the heart between the sternum and backbone of the victim, comprising:

(a) means generating a source of periodic pressure sufficient when applied to the sternum of the victim to compress the chest sufficiently to thereby compress the heart of the victim between the sternum and the backbone of the victim; and

(b) means adapted to be attached to the chest of the victim cooperating with said means for generating periodic pressure to periodically apply in a timed sequence sufficient pressure on the sternum of the victim to periodically compress the victim's chest whereby the victim's heart is periodically compressed between the victim's sternum and backbone;

(c) said means for generating periodic pressure including an electric motor, a gear reduction unit driven by said motor and providing a high torque low RPM power shaft, an actuator control assembly mounted on said power shaft and rotatable therewith and providing a crank shaft adapted to rotate in a circular path about the power drive shaft, a master hydraulic cylinder having a reciprocable hydraulic ram one end of which is pivotally connected to said crank shaft, said hydraulic ram generating periodic hydraulic pressure in said master hydraulic cylinder when said ram is reciprocated, and means connecting said master hydraulic cylinder to said means adapted to be attached to the chest of the victim whereby the pressure generated by said master cylinder is effective to compress the victim's chest.

4,702,232

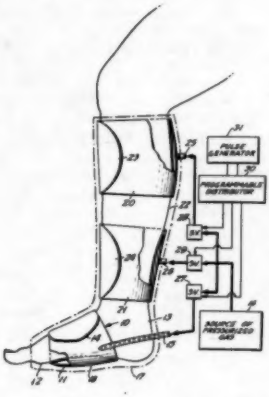
METHOD AND APPARATUS FOR INDUCING VENOUS-RETURN FLOW

Arthur M. N. Gardner, and Roger H. Fox, both of Devon, England, assignors to Electro-Biology, Inc., Parsippany, N.J.

Filed Oct. 15, 1985, Ser. No. 787,124

Int. Cl.[4] A61H *7/00*

U.S. Cl. 128—64 **10 Claims**



1. The method of promoting venous-blood flow in an impaired human leg, which method comprises repeating a cycle of specific sequential pump events wherein an artificially induced transient operation of the foot pump of the leg is followed by an artificially induced separate transient operation of the proximal calf pump of the leg and then by an artificially induced separate transient operation of the distal calf pump of the leg, the artificially induced transient operation of the foot pump comprising the steps of simultaneously applying (a) upward and spreading force at longitudinally spaced plantar regions of the sole of the foot, said regions being essentially limited by and between the ball and heel of the foot and (b) downward force at the region of the midtarsal joint, said forces being applied in a cyclical pattern of relatively rapid increase

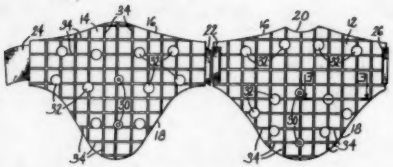
to a predetermined upper limit before relaxation for a period substantially exceeding the application time, whereby the arch of the foot is caused to flatten periodically and thus to stretch and neck down the internal local sectional area of the veins of the lateral plantar complex, with resulting foot-derived venous-pump action, whereby as a result of such sequencing of pump events, venous-blood flow is caused to substantially imitate that which would occur in a normal walking cycle wherein the weight-bearing phase is followed by plantarflexing of the ankle and then by dorsiflexing of the ankle.

4,702,233

VENTILATED NECK BRACE AND RELATED STRUCTURES

Florio F. Omicioli, 205 Elm St., Apt. 2, West Haven, Conn. 06516

Filed Mar. 19, 1986, Ser. No. 841,206
Int. Cl.[4] A61H *7/00*; A61F *5/01*
U.S. Cl. 128—75 **10 Claims**



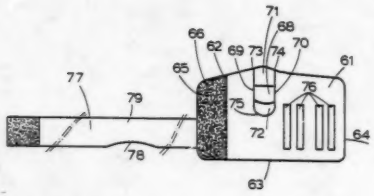
1. A body brace comprising a panel of flexible material for encircling a body section said panel having an inner surface for facing toward said body section, an opposite exterior surface for facing away from said body section and a plurality of vent holes between said inner and outer surfaces for providing air circulation to said body section, said panel inner surface having thereon a network of interconnected ventilation channels intersecting said vent holes, the width of said channels being less than the width of said vent holes.

4,702,234

SUPPORT FOR AIDING PROPRIOCEPTIVE INNERVATION

Jozef H. G. Huntjens, Schinnen, Netherlands, assignor to MacIntosh N.V., Stein, Netherlands

Filed Sep. 4, 1986, Ser. No. 903,491
Claims priority, application Netherlands, Sep. 17, 1985, 8502536
Int. Cl.[4] A61F *3/00, 13/06, 13/10*
U.S. Cl. 128—77 **11 Claims**



1. A support for a part of the body including a joint, comprising:

a sleeve member made substantially from elastic material and extending, after its application, between a proximal line and a distal line in respect of the joint,

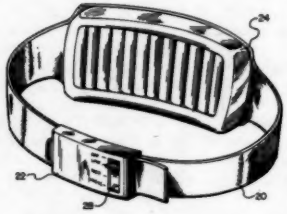
at least one frictional portion defined on the inner surface of the sleeve member, said frictional portion having a greater coefficient of friction in respect of the skin than the coefficient of friction of the other portions of the inner surface of the sleeve member, said frictional portion being defined on a portion of the inner surface of the sleeve member that is adapted to be in contact, after the application of the support to the part of the body, with portions of the surface of the skin having at least one of muscular and tendonous tissue underneath which can be innervated proprioceptively so as to initiate a predetermined change in position between skeletal parts situated on either side of the joint when the part of the body is moved and said frictional portion inhibits the movement of skin in contact therewith.

4,702,235

THERAPEUTIC INFLATABLE LUMBAR BRACE HAVING A HEATER

James K. Hong, 13704 Osborne St., Arleta, Calif. 91331

Filed May 17, 1986, Ser. No. 864,834
Int. Cl.[4] A61F *5/02, 7/08*
U.S. Cl. 128—78 **1 Claim**



1. A heated lumbar positioned air inflatable physiotherapeutic brace comprising:

(a) a belt completely encircling one's waist in a conformal manner with said belt having ends therewith; and a buckle attached permanently to one end of said belt receiving and removably captivating the other end,

(b) an air chamber integral with said belt on the surface contiguously engaging a persons lumbar area creating resilient yielding homogeneous pressure,

(c) a heater integrally embedded within said air chamber providing an elevated temperature within the brace providing physiologic relief of muscle myositis in the form of stress, strain, or fatigue, said heater further comprises metallic resistance wires embedded into the structure of the air chamber that is in physical contact with one's lumbosacral region, the wires having a resistance such that when an electrical current is passed therethrough that the energy is transformed into heat directly dissipated to the wearer's body, said resistance wires are separated into a plurality of circuits allowing a step control of the intensity of the heat conducted from the brace to one's body, said resistance wires further comprise an alternating current electrical power source and a direct current power source duplicating said resistance wires in such a manner as to provide heating when connected to either source independent of the other, said heater further having control means in the form of a manual switch having contact points for conducting electricity through circuits of said heater providing steps control of resistance for capacity modulation, and,

(d) means to inflate said air chamber to a pressure of sufficient intensity to provide a biomechanical restriction to specific muscles in the lumbar region for the ambulatory management of low back pain, said means to inflate further comprise a hand actuated bulb, having a manual valve, associateably joined to said air chamber and self-sealing disconnect means functioning such that said chamber is inflated by the squeezing of one's hand on the bulb increasing pneumatic pressure within the chamber using manual force which causes the bulb to become smaller in

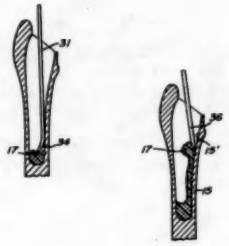
volume, driving air into the chamber and removal of the bulb without the loss of pressure characterized by the self-sealing function of the quick disconnect means.

4,702,236

REVISION ARTHROPLASTY METHOD AND RELATED INSTRUMENT

Samih Tarabichy, 5360 Patricia, #14, Montreal, Quebec, Canada H4V 1Z2, and Barry Miller, 211 Drakes Bay, Los Gatos, Calif. 95030

Filed Jun. 2, 1986, Ser. No. 869,259
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—92 V **3 Claims**



1. A method for the removal of thermoplastic polymer cement set in a bone cavity after a loosened or defective prosthesis component previously anchored in the thermoplastic cement has been removed from the bone cavity, said method comprising the step of:

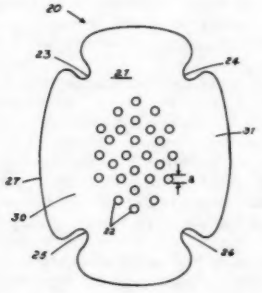
(i) removing cement from said cavity by the use of instruments having a heated working end heated to a temperature exceeding the melting point of said cement whereby cement can be removed without perforating or damaging the bone.

4,702,237

HEMORRHOID RETAINERS

Thomas J. Gianopoulos, 8070 12th Ave. South, Bloomington, Minn. 55420, and Wallace W. Becklin, 10510 Holly La., Maple Grove, Minn. 55369

Continuation of Ser. No. 690,619, Jan. 11, 1985, abandoned, which is a continuation-in-part of Ser. No. 393,132, Oct. 28, 1983. This application Aug. 27, 1986, Ser. No. 902,068
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—98.1 **8 Claims**



1. A hemorrhoid support device for a user having hemorrhoids that extend outside the anal orifice comprising a sheet having an adhesive layer on one side for attachment of said sheet to the anal area of the user having hemorrhoids that extend outside the anal orifice, said adhesive extending entirely across said sheet to thereby provide hemorrhoid support;

said sheet having sufficient flexibility so as to conform to the user's body movement yet sufficient strength so as to hold hemorrhoids within the anal orifice when said sheet is fastened over the anal orifice;

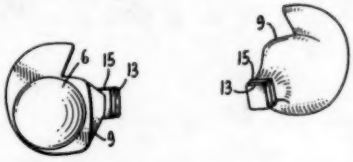
said sheet including at least one aperture to permit rapid egress of flatulence to thereby prevent flatulence from dislodging said hemorrhoid support device.

4,702,238

EARPLUG

Robert T. Scott, 416 Lighthouse Ave., Santa Cruz, Calif. 95060

Filed Apr. 3, 1986, Ser. No. 847,676
Int. Cl.[4] A61F *11/00*
U.S. Cl. 128—151 **3 Claims**



1. An earplug made of solid, slow recovery foam, having an inwardly extending conical portion adapted to fit into and fill the auricle, and said conical portion extending into the outer portion of the auditory canal, terminating in a rectangular knob with a flat solid wall, said knob sealing off the meatus of the external ear canal without substantially penetrating the external ear canal, and having an enlarged external flange of more than twice the cross-sectional area of the external ear canal, the external surface of said plug being convex to reflect away sound whereby the convex surface provided by the external surface of the earplug and the multitude of cells within the body of the foam earplug dramatically reflect and attenuate sound and whereby a sound and water seal is formed at the auricle.

4,702,239

UNDERWEAR FOR MEN

Tadashi Ichikawa, 22, Kasuga-cho, Gifu-shi, Gifu-ken, Japan

Filed Apr. 1, 1986, Ser. No. 846,709
Claims priority, application Japan, Apr. 3, 1985, 60-71400
Int. Cl.[4] A61F *5/40*
U.S. Cl. 128—159 **4 Claims**

1. An underwear for men comprising a cloth belt and an adjustable elastic belt for fastening said cloth belt on the waist of the user, said cloth belt integrally having:

a hip covering portion which covers the user's hips and to which said elastic adjustable belt is fixed;

a crotch covering portion having a narrower breadth than said hip covering portion in order to cover the user's crotch;

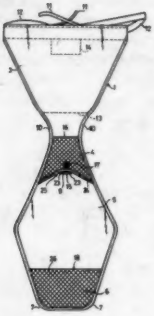
a belly covering portion having a wider breadth than said crotch covering portion inorder to cover the user's belly; and

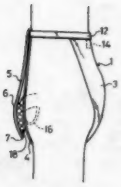
a pending portion which is adapted to be turned over said elastic adjustable belt in such a way that it hangs down therefrom in front of the belly covering portion, said elastic belt preventing said cloth belt from being longitudinally displaced due to movement of the user,

said crotch covering portion including an accommodating portion in the form of a cover piece for accommodating and supporting the scrotum of the user, and having a hole through which the penis of the user is exposed to the outside, and

said pending portion having an accommodating portion for

accommodating the penis exposed from said hole, the length of said pending portion being such that the penis





accommodating portion lies adjacent the penis of the user exposed from said hole.

4,702,240

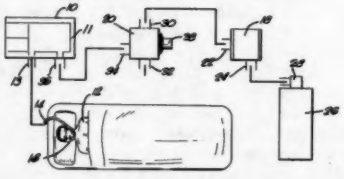
DEMAND-RESPONSIVE GAS BLENDING SYSTEM FOR MEDICAL VENTILATOR

Samir M. Chaoui, Riverside, Calif., assignor to Bear Medical Systems, Inc., Riverside, Calif.

Filed Jul. 22, 1986, Ser. No. 888,776

Int. Cl.[4] A62B *7/00*

U.S. Cl. 128—204.18 **27 Claims**



1. A gas blending system for blending two gases in response to a sub-ambient demand applied by a ventilator or the like, said gas blending system comprising:

positive displacement gas pump means for periodically creating said sub-ambient demand;

demand valve means, having an outlet, and an inlet adapted to be coupled to a pressure-regulated supply of a first gas, for providing a flow of said first gas from said inlet to said outlet, in proportion to the demand experienced by said outlet; and

a blending valve, having a first inlet coupled to the outlet of said demand valve means, a second inlet coupled to a substantially ambient-pressure supply of a second breathable gas, and a blended gas outlet adapted to be fluidly coupled to said gas pump means, wherein said blending valve includes proportioning means for selectively adjusting the relative flow capacities of said first and second inlets;

whereby, when said inlet of said demand valve means is coupled to a pressure-regulated supply of a first gas, and said blended gas outlet is coupled to said gas pump means, the total blended gas flow through said blended gas outlet is proportional to the total demand applied to said blended gas outlet by said gas pump means, and whereby the percentage of said first gas in said total blended gas flow is proportional to the ratio of the demand applied to said first blending valve inlet to the total demand applied to said blended gas outlet.

4,702,241

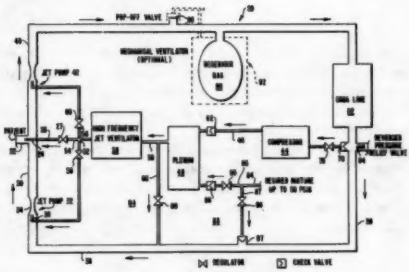
SELF-CONTAINED JET PUMP BREATHING APPARATUS

Joachim S. Gravenstein, and Samsun Lampotang, both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

Filed Oct. 11, 1985, Ser. No. 786,468

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—204.25 **9 Claims**



1. For introducing gases into the lungs of a patient, a self-contained jet pump breathing apparatus comprising:

gas introduction means for supplying gas to and receiving gas from the lungs of the patient;

inspiratory conduit means for supplying gas to said gas introduction means;

expiratory conduit means for receiving gas from said gas introduction means;

third conduit means for fluidically communicating said inspiratory conduit means with said expiratory conduit means; a conduit loop defined by said inspiratory conduit means, said expiratory conduit means and said third conduit means;

inspiratory jet pump means operatively positioned in said inspiratory conduit means for sweeping fresh gases toward the gas introduction means;

expiratory jet pump means operatively positioned in said expiratory conduit means for sweeping gases exhaled by the patient away from the gas introduction means;

gas compressor means having an inlet and an outlet, and outlet conduit means connected to the compressor means outlet for supplying compressed gas from the gas compressor means to the inspiratory and expiratory jet pumps and inlet conduit means connected between the compressor means inlet and said conduit loop for supplying gas to said compressor means; and

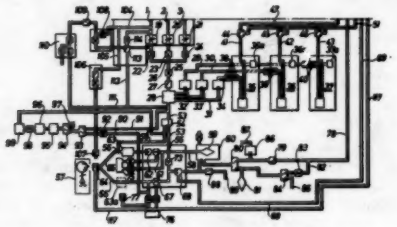
wherein said gas introduction means includes jet nozzle means for receiving compressed gas from the gas compressor means outlet by way of said outlet conduit means to thereby provide gas to the lungs of the patient.

4,702,242

RESPIRATOR AND/OR ANESTHESIA SUPPLY APPARATUS

Sven M. Broddner, Upplands Vasby; Leif Bromster, Solna; Ulf Lundell, Grodinge, and Goran S. Pilenvik, Stockholm, all of Sweden, assignors to Gambro Engstrom AB, Sweden

Filed Jun. 25, 1985, Ser. No. 748,772
Claims priority, application Sweden, Jun. 28, 1984, 8403450
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—205.13 **46 Claims**



1. Apparatus for supplying a gas stream to a patient comprising ventilator means for delivering said gas stream to said patient, said ventilator means including inhalation means comprising inhalation conduit means and exhalation conduit means for removal of an exhaled has stream from said patient, supply means for supplying said gas stream to said ventilator means, a movable wall member having an inner surface and an outer surface, said inner surface of said movable wall member being in contact with said gas stream and with said inhalation conduit means, and said outer surface of said movable wall member being separated from said gas stream and being in contact with a propellant gas stream, whereby an increase in pressure in said gas stream within said inner surface of said movable wall member can be created by the application of said propellant gas stream against said outer surface of said movable wall member, propellant gas stream conduit means for supplying said propellant gas stream to said outer surface of said movable wall member, and manual pump means associated with said propellant gas stream, said manual pump means is inflated in part by said propellant gas whereby an increased pressure can be created in said propellant gas stream, thereby resulting in the application of said propellant gas stream against said outer surface of said movable wall member by the actuation of said manual pump means, and a resultant increase in pressure in said gas stream within said inner surface of said movable wall member, thereby resulting in an increased flow of said gas stream through said inhalation conduit means to said patient.

4,702,243

EMERGENCY AIR SUPPLY APPARATUS

Ronald D. Smith, Appleton City, Mo. 64724

Continuation-in-part of Ser. No. 775,535, Sep. 13, 1985, abandoned, which is a continuation of Ser. No. 531,960, Sep. 14, 1983, abandoned. This application Aug. 21, 1986, Ser. No. 899,066
Int. Cl.[4] A62B *7/00*
U.S. Cl. 128—205.24 **10 Claims**

7. Emergency breathing apparatus comprising:

a rigid face mask for application to the face;

releaseable means for securing said mask on the face;

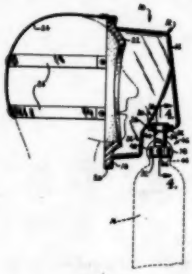
a rigid fitting secured rigidly to said mask, said fitting having a flow path therethrough communicating with the interior of the mask;

a portable container holding compressed air;

a valve body on said container presenting a flow passage therethrough, said flow passage providing communication between the inside of the container and said flow path;

a tapered valve seat in said valve body disposed in the flow passage;

a valve element in said flow passage movable therein away from and toward said valve seat between open and closed positions respectively, said valve element having a tapered configuration complemental to the valve seat and said valve element seating against the valve seat to block flow through said flow passage in the closed position, said valve element being unseated from the valve seat in the open position to allow flow through the flow passage;



yieldable means for urging said valve element toward the closed position;

a threaded connection between said valve body and fitting permitting the valve body to be threaded to said fitting to suspend the container from the mask; and

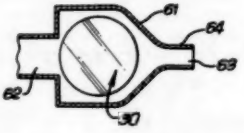
a rigid projection on said fitting at a location to act against said valve element in a manner to displace said valve element from the valve seat from the closed position to the open position when the valve body is threaded to the fitting, whereby air is made available to the mask automatically when the valve body is threaded to the fitting.

4,702,244

SURGICAL DEVICE FOR IMPLANTATION OF A DEFORMABLE INTRAOCULAR LENS

Thomas R. Mazzocco, Granada Hills, Calif., assignor to Staar Surgical Company, Monrovia, Calif.

Division of Ser. No. 346,105, Feb. 5, 1982, Pat. No. 4,573,998. This application Feb. 27, 1986, Ser. No. 834,200
Int. Cl.[4] A61B *17/00*; A61F *2/16*
U.S. Cl. 128—303 R **12 Claims**



1. A surgical device for implantation of an artificial intraocular lens in the eye through a relatively small incision made in the ocular tissue, said device comprising a chamber in a forward end of said device; means for containing said intraocular lens in an unstressed state and for orienting said intraocular lens in a prescribed orientation to facilitate anterior or posterior chamber lens placement substantially perpendicular to the optical axis, said lens having a deformable optical zone portion; means for exerting a force on said lens sufficient to deform said lens such that said optical zone portion is deformed to a diameter of 80% or less than the cross-sectional diameter of said optical zone portion in an unstressed state and to expel said lens from said device for placement of said lens in the eye.

4,702,245

PULSED LASER FOR MEDICAL APPLICATIONS

Eckhard Schröder, Eckental, and Reinhardt Thyzel, Heroldsberg, both of Fed. Rep. of Germany, assignors to Meditec-Reinhardt Thyzel GmbH, Heroldsberg, Fed. Rep. of Germany

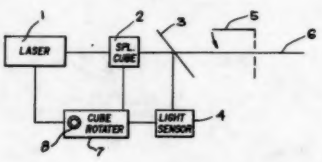
PCT No. PCT/DE84/00225, § 371 Date Jun. 27, 1985, § 102(e) Date Jun. 27, 1985, PCT Pub. No. WO85/01869, PCT Pub. Date May 9, 1985

PCT Filed Oct. 29, 1984, Ser. No. 758,662

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1983, 3339370

Int. Cl.⁴ A61B *17/36*

U.S. Cl. 128—303.1 **6 Claims**



1. A safety system for treatment lasers comprising,

a pulsed laser emitting a series of beam pulses aimed along a laser beam path at a target,

a polarization splitter cube rotatably fixed in said laser beam path, said beam pulses along said beam path having a defined polarization plane and having an energy regulated by rotation of said polarization splitter cube,

a beam splitter arranged in a fixed manner in said beam path beyond said polarization splitter cube, said beam splitter deflecting at least a portion of the beam pulses,

a light-sensitive element disposed to receive said portion of beam pulses deflected by said beam splitter,

a control means for controlling the rotation of said polarization splitter cube and for initializing beam pulses, including treatment pulses and test pulses, said treatment pulses having a first beam energy, said control means initializing at least one test pulse in time relation to said treatment pulses, said test pulse having a second beam energy, said control means being in communication with said light-sensitive element for determination of beam energy, said control means connected to provide rotation to said polarization splitter cube reducing an error amount when said second beam energy represents a desired output beam pulse energy plus an error amount, said control means automatically rotating said polarization splitter cube into a position which establishes the passage of minimum laser energy upon initial activation of said laser, and

shutter means disposed in said beam path for automatically blocking said test pulses from the target, said shutter means permitting said treatment pulses to travel to the target.

4,702,246

HEATING INSTRUMENT FOR TREATING A DEFORMED NAIL

Cedric R. Ellis, 16 Grosvenor Rd., Scarborough, Yorkshire, England YO11 2NA; Peter G. Long, Upper Poppleton, England; Christopher A. Marshman, Dunnington, England, and David J. Gillery, Acomb, England, assignors to Cedric R. Ellis, Yorkshire, England

Filed Jul. 24, 1985, Ser. No. 758,400

Claims priority, application United Kingdom, Jul. 24, 1984, 8418796

Int. Cl.⁴ A61B *17/00*

U.S. Cl. 128—303.1 **15 Claims**

1. An instrument for treating a deformed nail having a nail bed on a human patient, said instrument comprising:

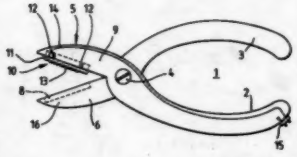
a first jaw;

a thermally insulating portion on said first jaw;

an electrical heating element mounted on said thermally insulating portion, whereby heating is confined to the region of said heating element, said electrical heating element having a low thermal mass, such that it is operative to heat up and cool down rapidly;

a second jaw cooperable with said first jaw;

means for opening and closing said first and second jaws;



said first and second jaws cooperating to clamp therebetween a portion of said nail, with said electrical heating element in direct thermal contact with a face of said nail, to thereby apply sufficient heat to said nail to facilitate bending thereof; and

a thermal protection portion on one of said jaws, said thermal protection portion protecting said nail bed from temperatures prevailing at said electrical heating element, so that the patient is not subjected to discomfort by burning.

4,702,247

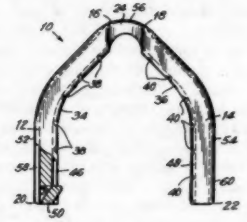
LIGATING CLIP

Joseph W. Blake, III, New Canaan, Conn., and Jack W. Kaufman, Merrick, N.Y., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Aug. 20, 1985, Ser. No. 767,472

Int. Cl.⁴ A61B *17/12*

U.S. Cl. 128—325 **7 Claims**



1. A hemostatic ligating clip device for closing the tube of a blood vessel capable of being applied by a clip applicator, comprising, in combination,

a pair of opposed, flexible, semi-rigid, elongated, first and second leg members having first and second connecting ends, opposed first and second free ends, and facing first and second inner sides, respectively, said first and second leg members extending in a longitudinal dimension between said first and second connecting ends and said first and second free ends, respectively,

a flexible, semi-rigid bridge portion having opposed ends connected to said first and second connecting ends,

said leg members being movable from an open mode wherein said clip device is mounted in said clip applicator and said leg members are spaced apart, to a closed mode wherein said clip device has been applied to said blood vessel and said leg members are separated by the wall of said blood vessel, said first and second leg members being in proximate association and positioned in said longitudinal dimension substantially transverse to said blood vessel,

a plurality of first grooves formed in said first leg member at

said first side in parallel relationship at a first slant relative to said longitudinal dimension wherein said blood vessel is inhibited from sliding between said first and second leg members in a first direction transverse to said first slant,

a plurality of second grooves formed in said second leg member at said second side in parallel relationship at a second slant relative to said longitudinal direction wherein said blood vessel is inhibited from sliding between said leg members in a second direction transverse to said second slant, said first and second slants being generally in transverse relationship, and

wherein said first and second leg members form first and second inner channels, respectively, at the centers of said first and second facing sides along said longitudinal dimension, said first and second channels being in general opposed relationship when said leg members are in said closed mode, said blood vessel being spaced inwardly from said first and second free ends, said first leg member having a locking tab extending outwardly from said first channel at said first free end toward said second leg member, said second channel of said second leg member being adapted to receive said locking tab at said second free end, wherein in said closed mode said first and second leg members are prevented from cross-movement relative to one another and relative to said longitudinal dimension.

4,702,248

APPARATUS FOR GENERATING HIGH FREQUENCY SHOCK WAVES PROVIDED WITH A SCREEN WHICH REDUCES THE ELECTRIC LEAKAGES

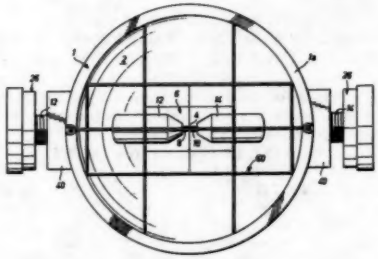
Jean-Louis Mestas, and Dominique Cathignol, both of Lyons, France, assignors to Technomed International, Paris and Institut National de la Sante et de la Recherche Medicale, Lyons, both of, France

Filed Oct. 27, 1987, Ser. No. 872,957

Claims priority, application France, Jan. 31, 1986, 86 01381

Int. Cl.⁴ A61B *17/00*

U.S. Cl. 128—328 **4 Claims**



1. In an apparatus for generating high frequency shock waves, comprising a truncated ellipsoidal reflector for reflecting the shock waves, comprising a cavity constituting a chamber for reflecting said shock waves of the same truncated ellipsoidal form, at least one of the two focal points of the ellipsoid is disposed in said chamber opposite said truncated part, said chamber being filled with a dielectric liquid for transmitting the shock waves, for example water or an oil, a shock wave generator device, conventionally comprising two electrodes, is disposed at least partly inside said chamber, with said two electrodes arranged to generate an electric arc or discharge at said focal point lying in said chamber opposite said truncated part; and means are provided for selectively and substantially instantaneously delivering an electric voltage to said electrodes provoking said electric arc or discharge between said electrodes generating said shock waves in said liquid at said focal point, Wherein the improvement comprises the provision of an equipotential screen applied on said truncated part, being fast with the ellipsoidal reflector and directly connected to earth by its support formed by the ellipsoidal reflector itself.

4,702,249

APPARATUS FOR THE NON-CONTACT DISINTEGRATION OF CONCREMENTS PRESENT IN A BODY

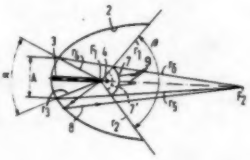
Marcel R. de la Fonteijne, Delft, Netherlands, assignor to B.V. Optische Industrie "De Oude Delft", Netherlands

Filed Feb. 12, 1985, Ser. No. 700,728

Claims priority, application Netherlands, Feb. 16, 1984, 8400504

Int. Cl.⁴ A61B *17/22*

U.S. Cl. 128—328 **13 Claims**



3. An apparatus for the non-contact disintegration of concrements present in a body by means of sound shock waves generated by spark discharge between two electrodes in a focus F_1 of at least one liquid-filled rotationally symmetrical reflector formed in a reflector block, said sound shock waves being focussed on a focal point F_2 situated outside said reflector block, characterized in that between said focus F_1 and said focal point F_2, in a region bounded by an imaginary conical surface defined by an edge of said reflector and said focus F_1, there is positioned a reflecting surface facing said reflector and having a form to reflect against said reflector sound shock waves originating from said focus F_1 and impinging on said reflecting surface.

4,702,250

SURGICAL IMPLEMENT PARTICULARLY USEFUL FOR SUTURING PROSTHETIC VALVES

Yoel Ovil, Ramat Hasharon, and Morris Levy, Tel-Aviv, both of Israel, assignors to Galil Advanced Technologies Ltd., Ramat Gan, Israel

Continuation-in-part of Ser. No. 644,950, Aug. 28, 1984, abandoned. This application Jan. 23, 1986, Ser. No. 821,988

Claims priority, application Israel, Sep. 2, 1983, 69635; Feb. 27, 1985, 74460

Int. Cl.⁴ A61B *17/04, 17/00*

U.S. Cl. 128—334 R **18 Claims**

1. A surgical instrument to aid in suturing a prosthetic valve into a heart annulus, comprising:

a manually grippable handle;

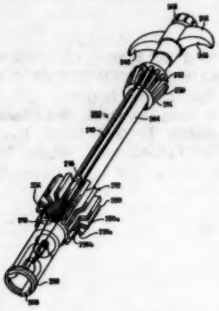
a holder carried at one end of the handle for releasably holding a prosthetic valve to be pre-loaded thereon;

a first ring fixed to the handle and having means for securing thereto one end of a plurality of sutures to be pre-loaded onto the handle with each suture carrying a needle at its opposite end passing through the prosthetic valve when pre-loaded on said handle;

and a second ring fixed to said handle and including a plurality of circumferencially-spaced projections each engageable with an intermediate portion of a suture for releasably retaining the plurality of sutures each pre-loaded in folded condition on the handle and extending longitudinally thereof;

said two rings being located on said handle such that each

suture has a length between said prosthetic valve and said needle-carrying end of the suture which is at least twice



the length of the suture between said secured one end and said prosthetic valve.

4,702,251

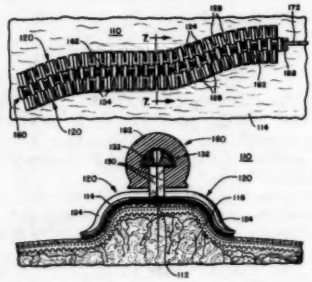
WOUND CLOSURE DEVICE

Joseph C. M. Sheehan, Burr Ridge, Ill., assignor to Kells Medical, Incorporated, Burr Ridge, Ill.

Continuation-in-part of Ser. No. 661,375, Oct. 16, 1984, Pat. No. 4,605,005, which is a continuation-in-part of Ser. No. 472,053, Mar. 10, 1983, Pat. No. 4,526,173, which is a continuation-in-part of Ser. No. 367,671, Apr. 12, 1982. This application Feb. 5, 1985, Ser. No. 698,243

Int. Cl.[4] A61B *17/08, 17/04*

U.S. Cl. 128—335 **17 Claims**



1. A wound closure device for a wound in a region of skin which defines an epidermal layer and a germinal layer, said device comprising:

means for defining first and second concave skin contacting surfaces, each presenting a respective concave surface to the epidermal layer;

an adhesive layer covering the first and second skin contacting surfaces and adapted to secure the skin contacting surfaces to the epidermal layer on either side of the wound to cause the epidermal layer to conform to the concave skin contacting surfaces; and

means for holding the first and second skin contacting surfaces in alignment to close the wound, to hold the epidermal layer together in alignment across the wound, and to evert the skin on both sides of the wound to enhance alignment of the germinal layer across the wound and thereby reduce scar tissue formation.

4,702,252

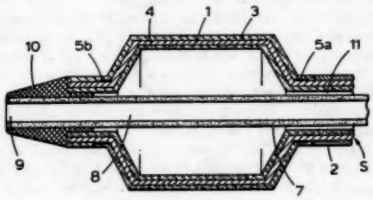
CATHETERS

Kenneth J. Brooks, Lancing; Michael A. Wilkinson, East Preston; Peter H. Hannam, and Neil A. Whiteside, both of Worthing, all of England, assignors to Smiths Industries Public Limited Company, London, England

Continuation-in-part of Ser. No. 541,665, Oct. 13, 1983, abandoned. This application Jan. 27, 1986, Ser. No. 822,839

Int. Cl.[4] A61M *29/02, 25/00*

U.S. Cl. 128—344 **48 Claims**



1. A dilatation catheter wherein a shaft of the catheter comprises a tube of material having an inelastic coating of semirigid material extending from the proximal end of the catheter over a major portion of the length of the shaft and also having an elastic outer coating extending over a minor portion of the length of the shaft, a passage in said tube communicating with said minor portion to provide a path for the application of inflating fluid thereto, whereby the said minor portion is inflatable in response to the application of the inflating fluid, said tube comprising braided material having a preselected maximum radial extension to limit the extent of inflation of said elastic coating, said major and minor portions being contiguous with each other and the coatings being bonded to said braided material.

4,702,253

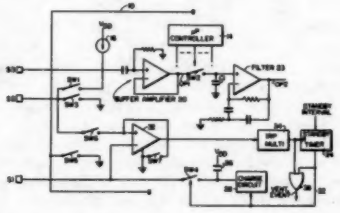
METABOLIC-DEMAND PACEMAKER AND METHOD OF USING THE SAME TO DETERMINE MINUTE VOLUME

Tibor A. Nappholz, Englewood; Mark Lubin, and Harry L. Valenta, Jr., both of Aurora, both of Colo., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Filed Oct. 15, 1985, Ser. No. 787,125

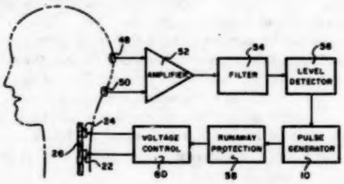
Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 PG **28 Claims**



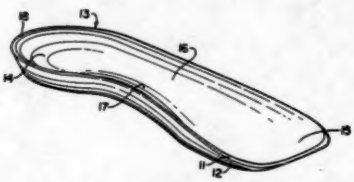
1. A metabolic-demand pacemaker comprising means for pacing a patient's heart at a controlled rate, means for placement in a blood vessel in the vicinity of the patient's pleural cavity and for monitoring the impedance of the blood therein, the blood impedance varying in accordance with the patient's pleural pressure, means responsive to said monitoring means for determining the patient's minute volume, and means for changing said controlled rate in accordance with the patient's minute volume.

4,702,254
NEUROCYBERNETIC PROSTHESIS
Jacob Zabara, Apt. 19F, 200 Locust St., Philadelphia, Pa. 19106
Continuation-in-part of Ser. No. 531,955, Sep. 14, 1983, abandoned. This application Dec. 30, 1985, Ser. No. 814,846
Int. Cl.⁴ A61N *1/32*
U.S. Cl. 128—421 **17 Claims**



1. A method of controlling or preventing involuntary movements such as caused by epileptic seizures, cerebral palsy, Parkinson's disease, spasticity, motor disorders and the like comprising determining that an involuntary movement is going to occur and thereafter applying a pulsed electrical signal to the vagus nerve to thereby prevent or control such movement.

4,702,255
ORTHOPEDIC APPARATUS
Joseph L. Schenkl, 2131 Jackson St., Hollywood, Fla. 33020
Filed Jun. 17, 1985, Ser. No. 745,861
Int. Cl.⁴ A43B *7/14, 7/22*
U.S. Cl. 128—586 **29 Claims**



1. An orthotic for supporting a human foot within a shoe and controlling the motions of the foot comprising a formed plate having an upper surface having a shape substantially coinciding with the underside shape of said foot, an inside arch portion suspended so as to not contact the inside of the shoe and means integral with said formed plate for variably altering the flexibility of any portion of said formed plate while substantially maintaining the rigidity of the suspended arch portion.

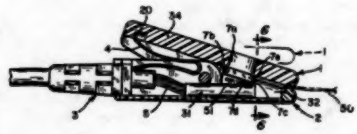
4,702,256
ELECTRICAL CONNECTOR FOR A DISPOSABLE ELECTRODE
Earl F. Robinson, El Toro, and Rex O. Bare, Irvine, both of Calif., assignors to Andover Medical Incorporated, Haverhill, Mass.
Continuation of Ser. No. 664,130, Oct. 24, 1984, abandoned. This application Dec. 5, 1986, Ser. No. 938,302
Int. Cl.⁴ A61B *5/04*
U.S. Cl. 128—639 **6 Claims**

1. An electrical connector for connecting to a thin flexible electrode of the type used for medical monitoring, said connector comprising:

an upper jaw member formed of an insulative material, said upper jaw member having a forward end, a rearward end, first means for pivotally mounting said upper jaw, an angled edge member extending downward from said upper jaw, located forward of said first means for pivotally mounting, and first and second ramp members, extending downward from said upper jaw, on either side of said angled edge member, and tapering toward the forward end of said upper jaw;

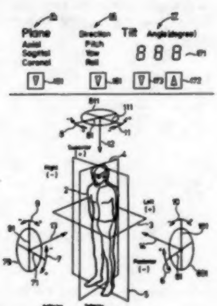
a lower jaw, having a forward end, a rearward end and a second means for pivotally mounting said lower jaw, said second means for pivotally mounting engaging said first means for pivotally mounting such that said forward ends of said upper and lower jaw members may be pivoted into contact with one another;

spring means for urging said forward ends of said upper and lower jaws together; and



electrical contact means, mounted to and extending upward from said lower jaw member and including a rearward facing shoulder, said electrical contact means located on said lower jaw such that when said forward ends of said upper and lower jaws are in contact, said electrical contact means is located intermediate said first and second ramps of said upper jaw and such that said rearward facing shoulder of said contact member is located forward of and adjacent to said angled edge member mounted to said upper jaw.

4,702,257
OPERATOR CONSOLE FOR IMAGING DIAGNOSTIC APPARATUS
Masao Moriyama; Masahiro Ohta; Toshiaki Yagi, and Kazuhiro Kawano, all of Tokyo, Japan, assignors to Yokogawa Electric Corporation and Yokagawa Medical Systems, Limited, both of Tokyo, Japan
Filed Sep. 26, 1986, Ser. No. 911,734
Claims priority, application Japan, Nov. 25, 1985, 60-264475
Int. Cl.⁴ A61B *5/05*
U.S. Cl. 128—653 **1 Claim**



1. An operator console for use in an imaging diagnostic apparatus comprising

body figure display means for displaying a frontal full length figure of a human body as viewed obliquely from above;

axial plane display means for displaying a figure representing the axial plane of the body figure in superposed relation to the body figure;

axial plane pitching display means for displaying a figure representing the pitching of the axial plane with respect to the figure representing the axial plane;

axial plane yawing display means for displaying a figure

representing the yawing of the axial plane with respect to the figure representing the axial plane;

sagittal plane display means for displaying a figure representing the sagittal plane of the body figure in superposed relation to the body figure;

sagittal plane rolling display means for displaying a figure representing the rolling of the figure representing the sagittal plane;

sagittal plane yawing display means for displaying a figure representing the yawing of the figure representing the sagittal plane;

coronal plane display means for displaying a figure representing the coronal plane of the body figure in superposed relation to the body figure;

coronal plane pitching display means for displaying a figure representing the pitching of the coronal plane with respect to the figure representing the coronal plane;

coronal plane rolling display means for displaying a figure representing the rolling of the coronal plane with respect to the figure representing the coronal plane;

plane designating means manipulatable by an operator to output a signal for designating a plane;

plane display control means for validating the display operation of one among the axial plane display means, sagittal plane display means, and coronal plane display means on the basis of the output signal of the plane designating means;

tilt direction designating means manipulatable by an operator to output a tilt direction designating signal; and

tilt direction display control means for validating the display operation of one among the axial plane pitching display means, axial plane yawing display means, sagittal plane rolling display means, sagittal plane yawing display means, coronal plane pitching display means, and coronal plane rolling display means on the basis of the output signal of the tilt direction designating means and the output signal of the plane designating means.

4,702,258

DEVICE FOR COMBINED B-SCAN AND B/A IMAGING

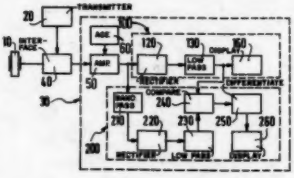
Jean-Marie Nicolas, Paris, and Patrick Pesque, Perigny, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 4, 1986, Ser. No. 825,844

Claims priority, application France, Feb. 8, 1985, 85 01790

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—660 **4 Claims**



1. A device for the production of both conventional and B/A second order non-linearity images of objects, notably biological tissues, by ultrasound echography comprising:

an ultrasound transducer;

transmitter means connected to the transducer to produce repeated transmission of pulses of ultrasound energy;

receiver means connected to the transducer for receiving signals which correspond to echoes of the pulses of ultrasound energy which are received by the transducer, said receiver means comprising:

an amplifier, with automatic gain control, connected to receive and amplify signals from the transducer;

a first processing channel for producing conventional images, having an input connected to the output of the amplifier and comprising, in functional cascade connection, a first envelope detector and first display means; and

a second processing channel for producing B/A second order non-linearity images, having an input connected to the output of the amplifier and comprising, in functional cascade connection, a bandpass filter, a second envelope detector, comparison means which compare the output of the first envelope detector with the output of the second envelope detector, differentiation means, and second display means;

wherein the transducer has a bandwidth which is approximately equal to or greater than one octave, the transmitter means comprise means for generating transducer activation signals having the nominal frequency f_0 in the vicinity of the lower limit of the bandwidth of the transducer, the spectrum of the activation signals excludes a frequency $f_1 = 2f_0$, and the bandpass filter has a central frequency equal to said frequency f_1.

4,702,259

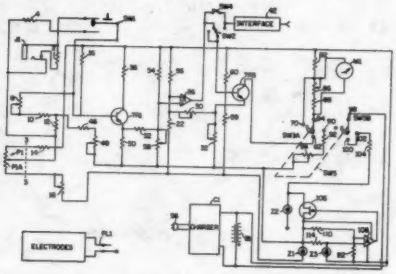
DEVICE FOR MEASURING AND INDICATING CHANGES IN RESISTANCE OF A LIVING BODY

Marc Ferreira, Los Angeles; John McCormick, Grass Valley; Raymond Bernard, Los Angeles; Joseph Butryn, Los Angeles, and Ronald Clifford, Los Angeles, all of Calif., assignors to Author's Family Trust, Los Angeles, Calif.

Continuation-in-part of Ser. No. 773,348, Sep. 6, 1985, abandoned. This application Sep. 4, 1986, Ser. No. 903,698

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—734 **7 Claims**



1. A device for measuring and indicating changes in a living body comprising:

an analog portion, said analog portion comprising a bridge network having on one side thereof a first resistance arm connected in series with a second resistance arm, and on another side thereof a first voltage arm connected in series with a second voltage arm, there being connected in series between the junction of the first and second resistance arms and the first and second voltage arms an amplifier circuit and current indicating means indicating changes in balance of said bridge network, two electrodes to be connected to a living body, one of said electrodes being electrically connected to a terminal of one of said resistance arms, whereby said living body is adapted to be connected across said one of said resistance arms, a range control device comprising a first gang of a double ganged potentiometer coupled in parallel with said first voltage arm, said first gang of said double ganged potentiometer having a sliding contact electrically connected to a terminal of said first voltage arm, the other of said electrodes being electrically connected to said sliding contact, a variable resistor electrically coupled to said one or said electrodes which is electrically connected to said terminal of one of said resistance arms and the junction of the first and second resistance arms for enabling a balance to be

established in an initial setting of said bridge network, said amplifier circuit comprising a first transistor emitter follower, an operational amplifier and third transistor connected to the output of said emitter follower with one input of said operational amplifier being connected to the emitter of said first transistor and the output of the operational amplifier being connected to a base of said third transistor and a collector of the third transistor forming an output of said transistorized amplifier circuit, a variable resistive feedback branch connecting the output of the operational amplifier to another input of the operational amplifier;

a digital portion, said digital portion comprising a comparator, a second gang of said double ganged potentiometer, a sliding contact of said second gang being coupled to one input of said comparator, an UP/DOWN counter coupled to the output of the comparator, a first counter coupled to the up count output of said UP/DOWN counter, a first digital display driver coupled to the output of the first counter, a first digital display driven by said first digital display driver for displaying the total rotation of said second gang of said double ganged potentiometer in one direction, a second counter coupled to both the up and down count outputs of the UP/DOWN counter, a second digital display driver coupled to the output of the second counter, a digital to analog converter having an input coupled to the output of said second counter and an output coupled to another input of said comparator for supplying a comparison value for said comparator, and a second digital display driven by said second digital display driver for displaying a present position of the second gang of said double ganged potentiometer; and

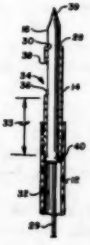
a source of power for supplying power to said analog and digital portions and for setting stable voltage levels as said first and second voltage arms of said bridge network, said source of power comprising a single battery, an operational amplifier coupled to said battery and a voltage controlled variable resistance means coupled to said battery and controlled by an output voltage of said operational amplifier.

4,702,260

FLEXIBLE BRONCHOSCOPIC NEEDLE ASSEMBLY

Ko Pen Wang, 1106 Nacirema La., Stevenson, Md. 21153

Filed Apr. 16, 1985, Ser. No. 723,907
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—753 **18 Claims**



1. A flexible bronchoscopic needle assembly for use with a flexible brochoscope to obtain tissue samples from a patient, said needle assembly comprising:

an elongated flexible catheter having proximal and distal ends and defining an interior cavity therebetween; and

a rigid hollow sampling needle rigidly and coaxially fixed to said catheter distal end, said sampling needle including means defining an opening at the distal end and a forward cutting edge about said opening means for cutting into desired tissue to obtain sample therefrom, the hollow of said sample needle being in communication with said interior cavity of said catheter;

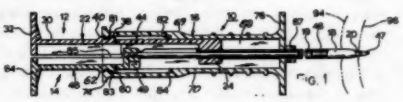
said hollow sampling needle also including a side wall and means defining an exposed lateral opening positioned rearwardly of said distal end within the side wall which is in communication with the hollow interior of said sampling needle to also permit tissue samples to pass through said lateral opening and into the hollow sampling needle whereby samples can pass into and through the hollow needle and into the elongated flexible catheter without removal of the catheter from the bronchoscope.

4,702,261

BIOPSY DEVICE AND METHOD

William D. Cornell, Ballwin; Richard W. Gilson, Dellwood; Richard A. Burkholder, St. Charles, all of Mo., and Ronald W. Ausherman, Alton, Ill., assignors to Sherwood Medical Company, St. Louis, Mo.

Filed Jul. 3, 1985, Ser. No. 752,342
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—754 **13 Claims**



1. A biopsy device comprising first and second members cooperable to effect the cutting of body tissue in the taking of a tissue sample from a patient, said first member comprising an elongate cannula having a distal end for cutting body tissue and an elongate actuator connected thereto at the proximal end thereof for moving said cannula, said second member including an elongate stylet slidable in said cannula and having a distal end for piercing body tissue and a cavity adjacent said distal end for receiving body tissue, and an actuator connected thereto at the proximal end thereof for moving said stylet, and an elongate housing having a passage therethrough for receiving said first and second members for longitudinal sliding movement relative thereof, said actuators being slidable in parallel side-by-side relation with a portion of each of said actuators longitudinally slidable distally into and proximally out of the proximal end of said passage said cannula and stylet being adapted to effect the cutting of tissue in response to predetermined relative movement thereof when body tissue is in said cavity, said first and second members being movable such that the proximal ends of said actuators are equidistant from the proximal end of said passage with said distal end of said cannula covering said cavity and proximal of said distal end of said stylet.

4,702,262

ELECTROMAGNETIC APPLICATOR FOR LOCALIZING HYPERTHERMIA HEATING IN A SYSTEM

Jorgen B. Andersen, and Povl Raskmark, both of Aalborg, Denmark, assignors to The Danish Hyperthermia Foundation, Aalborg, Denmark

Filed Jun. 26, 1985, Ser. No. 748,815
Claims priority, application Denmark, Jun. 27, 1984, 3128/84
Int. Cl.[4] A61N *1/40*
U.S. Cl. 128—804 **29 Claims**

1. An electromagnetic applicator for applying electromagnetic energy from a source to a selected human body location for hyperthermia treatment of deep-seated tumors, comprising:

a first conductive element having a predetermined length and width dimension;

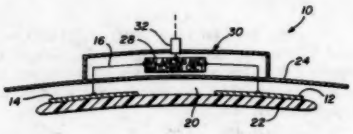
a second conductive element having a predetermined length and width dimension, said width of said second element being equal to the width of said first element;

a reflector spaced above said conductive elements for re-

flecting electromagnetic energy toward the selected human body location;

said first and second conductive elements having a surface adapted to be positioned adjacent the selected human body location and having a layer of lossless insulating material disposed on said surface of said conductive elements; and

said first and second conductive elements being spaced apart a predetermined distance and being disposed adjacent each other to define an aperture therebetween and said



aperture being the same in width as said conductive elements, the width of said conductive elements being determined by the lateral extent of the tumor and the distance between said conductive elements being determined by the distance the tumor is located beneath the surface of the body such that electromagnetic energy applied to said first and second conductive elements at a frequency to penetrate to the tumor causes electromagnetic radiation to be propagated from said aperture and defines the boundaries of the volume of heat received by the selected human body location which includes the tumor.

4,702,263

TOBACCO SMOKE FILTERS

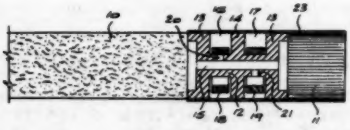
Mauritz L. Strydom, Stellenbosch, South Africa, assignor to Tobacco Research and Development Institute Limited, Switzerland

Filed May 20, 1986, Ser. No. 865,349

Claims priority, application South Africa, May 20, 1985, 85/3788

Int. Cl.[4] A24D *3/04*

U.S. Cl. 131—336 **3 Claims**



1. A cigarette comprising:

a paper encased body filled with cut tobacco,

a filter tip at one end of the body,

an insert interposed between the body and the filter tip,

an axial bore through the insert, the insert preventing flow of gas between the body and the filter tip except along the bore,

an annular waist in the insert around the bore,

perforated paper covering the waist to form an enclosed annular space,

an orifice between the annular space and the bore, and

a ring loosely surrounding the waist so that when the flow through the orifice exceeds a predetermined level, the ring obturates the orifice.

4,702,264

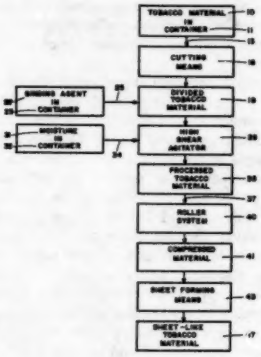
TOBACCO LEAF PROCESSING

William H. Graves, Jr., Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Aug. 11, 1986, Ser. No. 895,066

Int. Cl.[4] A24B *3/14*

U.S. Cl. 131—370 **40 Claims**



21. A process for providing processed tobacco in sheet-like form, the process comprising:

(a) providing tobacco material wherein at least a substantial proportion thereof is provided in essentially whole leaf form; and

(b) providing in essentially dry, substantially non-binding form, binding agent which is capable of being activated; and

(c) contacting the tobacco material and binding agent; and then

(d) subjecting the tobacco material and binding agent to high shear agitation (i) including a cutting action in an amount sufficient to provide divided tobacco material, (ii) in the presence of sufficient moisture to provide for activation of the binding agent but in the presence of a moisture content of less than 30 percent based on the total weight of the moisture, binding agent and tobacco material, and (iii) for a period of time sufficient to at least inititate activation of the binding agent; and then

(e) subjecting the tobacco material so subjected to high shear agitation to compressive treatment by passing the tobacco material, at least once, through the nip of a roller system; and then

(f) forming sheet-like processed tobacco material from the tobacco material which has been passed through the aforementioned roller system.

4,702,265

COMBINATION HEATED HAIR AND BEARD COMB

Willard T. Weddington, 4123 Roselawn Dr., Indianapolis, Ind. 46226

Filed May 21, 1986, Ser. No. 865,373

Int. Cl.[4] A45D *24/10*; H05B *1/00*

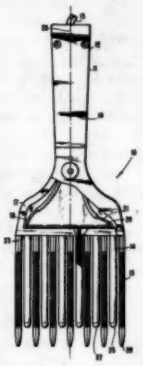
U.S. Cl. 132—118 **15 Claims**

1. A combination heated hair and beard comb comprising:

a handle;

a plurality of dual functioning unheated hair combing teeth cantileveredly mounted to said handle and extending lengthwise therefrom in a first direction for the first function of combing hair by moving said teeth in said first direction, said teeth including a plurality of outwardly opening slots formed laterally thereon and extending in a second direction perpendicular to said first direction in rows for a second function of combing a beard by moving said teeth in said second direction;

a plurality of heated teeth mounted to said handle and having electrical resistance means therein; and,



connecting means on said handle being operable to transfer electrical energy from a source to said electrical resistance means for the heating of said heated teeth.

4,702,266

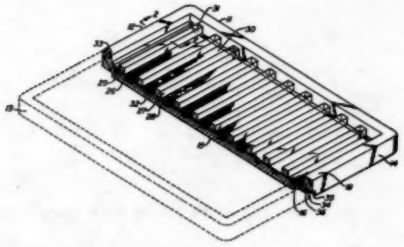
DESTAINING APPARATUS FOR ELECTROPHORESIS GELS

Daniel Y. M. Chu, San Francisco, Calif., assignor to Bio-Rad Laboratories, Inc., Richmond, Calif.

Division of Ser. No. 653,393, Sep. 20, 1987. This application Jun. 5, 1986, Ser. No. 871,058

Int. Cl.[4] B08B *3/02*

U.S. Cl. 134—60 **11 Claims**



10. A tray for supporting a plurality of tube gels in a flowing stream of destaining fluid, and for combining with additional said trays in a stack, said tray comprising:

a base and four raised sides, each side being of upright L-shaped cross-section opening inward and said base comprising a flat rectangular transparent plate secured to the bottom surface of the horizontal portion of said L along three of said sides leaving an elongate opening along said fourth side, each edge of said plate terminating on the inner side of the plane defined by the inner surface of the vertical portion of said L, such that said plate fits inside the raised sides of the next lower tray in said stack, with said sides of adjacent trays in said stack abutting to form a continuous wall;

a gel-supporting horizontal partition penetrable by said fluid, dividing the interior of said tray into upper and lower portions;

a plurality of non-penetrable vertical transparent partitions dividing said upper portion into a plurality of troughs parallel to said elongate opening, each trough sized to receive approximately one tube gel;

a plurality of transparent baffles in said lower portion parallel to and in staggered relation with said vertical partitions to define an undulated fluid flow path passing through said tube gels;

a pin projecting upward from the top of one of said raised sides; and

an inverted groove in the bottom of the side opposing the side bearing said pin, said groove running perpendicular to said opposing side and the inward end of said groove being truncated to limit the position therein of said pin of the next lower tray in said stack.

4,702,267

PESTICIDE RINSER

M. Ahmed Ashraff, 739 Pepperloaf Crescent, Winnipeg, Manitoba, Canada R3R 1G2

Filed May 15, 1985, Ser. No. 734,203

Claims priority, application Canada, May 17, 1984, 454611

Int. Cl.[4] B08B *3/02*

U.S. Cl. 134—166 R **5 Claims**

1. A hand-held fluid conducting device suitable for rinsing the interior of the bottom of pesticide containers, said device comprising a main, manually-graspable body having opposed ends with a fluid passage in said body, fluid inlet means in communication with said passage at one end of said body, said body having container rupturing means at the other end of the said body and extending therefrom, said container rupturing means comprising an elongated nozzle closed by a tapered wall terminating at its bottom end in a knife edge and an abutment means separating said body from said container rupturing means, a fluid passage in said container rupturing means in communication with said passage of said body, and fluid discharge means in communication with said fluid passage of said body, said fluid discharge means consisting essentially of a plurality of spaced-apart fluid openings peripherally located about the circumference of said container rupturing means, said openings being directed exclusively upwardly and outwardly from said container rupturing means towards said body, said openings being sufficiently spaced longitudinally downstream from said abutment means whereby, when said container rupturing means is inserted into said container through said bottom when said container is inverted, said fluid discharge means is effective to discharge said fluid primarily against the interior of said bottom of said container.

4,702,268

GAS VENTING VALVE

Kurt Ambruster, Bellevue; Charles J. Green, Vashon, and John M. Morris, Auburn, all of Wash., assignors to GT Development Corporation, Tukwila, Wash.

Filed Dec. 24, 1986, Ser. No. 946,497

Int. Cl.[4] F16K *17/00*

U.S. Cl. 137—202 **25 Claims**

1. A vent valve adapted to permit gas flow but close in response to liquid flow, comprising:

a passageway having a normally lower inlet and a normally upper outlet;

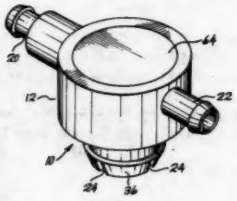
wall means in said passageway between said inlet and said outlet, defining an orifice;

a closure ball in said passageway below said orifice, said closure ball having a larger diameter than said orifice;

a conical support spaced upwardly from said orifice, said conical support including a central opening and surface means surrounding the opening and sloping upwardly and outwardly from the central opening;

a ball-shaped mass supported on said conical support, said mass being larger in diameter than said central opening;

a piston member between said mass and said orifice, said piston member having an upper portion positioned in the



central opening and a lower portion positioned to project into said orifice, said piston being movable between a lower position in which said lower portion projects through the orifice into contact with said closure ball, to prevent the closure ball from seating in said orifice, and an upper position in which said lower portion is spaced upwardly from said orifice, in a position to not interfere with the closure ball seating; and

wherein said conical support, said piston and said mass are so dimensioned that when the mass is centered on said conical support, said mass is in contact with the upper portion of the piston and biases the piston downwardly into said lower position.

4,702,269

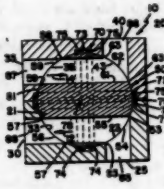
BY-PASS VALVE

Fredrick E. Schuler, St. Paul, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.

Continuation of Ser. No. 710,861, Mar. 12, 1985, abandoned. This application Dec. 30, 1986, Ser. No. 948,417

Int. Cl.[4] F16K *5/08, 51/00*

U.S. Cl. 137—246.12 **4 Claims**



1. A by-pass valve, comprising:

a generally spherical plug having an outer surface and at least two plug passages therethrough, said plug passages having opposing end openings defined by facing surfaces;

a housing for receiving said plug in a closely fitting relationship, said housing having a generally spherical inner surface including a plurality of housing passages having a plurality of ports, each of said ports having a surrounding seating surface, said ports being arranged to align with the end openings of at least two of said plug passages in at least a first orientation of said plug with respect to said housing to from a first group of corresponding mating pairs of said ports and said end openings and to form a first set of flow paths through said plug and housing passages and said first group of corresponding mating pairs, and a second orientation of said plug with respect to said housing to form a second group of corresponding mating pairs of said ports and said end openings and to form a second set of flow paths through said plug and housing passages and said second group of corresponding mating pairs, the seating surface of said port and the facing surface of said end opening of all of said corresponding mating pairs fitting closely adjacent to one another to minimize fluid flow therebetween;

first and second ring-like grooves orthogonally disposed in said inner surface of said housing, facing said outer surface of said plug, for distributing a pressurized fluid, said grooves separating the flow paths of said first set for said first orientation from each other and the flow paths of said second set for said second orientation from each other, said grooves completely surrounding each of said flow paths with respect to the other for both first and second sets of flow paths;

means for pressurizing said grooves with fluid, said pressurized fluid in said grooves flowing toward said flow paths along said outer surface of said plug, thereby preventing fluid in each flow path from leaking into other flow paths in either orientation of said plug; and

means for moving said plug with respect to said housing between the first and second orientations.

4,702,270

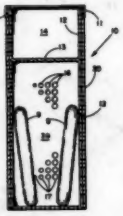
DISPERSAL MEMBER

Lloyd H. King, Sr., 5222 Green Farms Rd., Edina, Minn. 55436

Continuation-in-part of Ser. No. 798,184, Nov. 18, 1985, abandoned. This application Feb. 18, 1986, Ser. No. 830,673

Int. Cl.[4] B01D *11/00*

U.S. Cl. 137—268 **15 Claims**



1. A floating dispersal member having a top and a bottom comprising:

a cylindrical container having a dispersant compartment for holding a material to be dispersed into a fluid, said dispersant compartment located at the bottom of said dispersal member, said dispersant compartment having a top end and a bottom end;

a cylindrical housing located on said cylindrical container, said cylindrical housing rotatable to control the amount of fluid to flow through said dispersant compartment;

flotation means to support said floating dispersal member in a vertical floating condition in the fluid, said flotation means including a flotation compartment located at the top of said floating dispersal member, said flotation compartment operable to provide flotation to said dispersal member; and

a first plurality of openings located in said dispersant compartment to permit fluid to enter the top of said dispersant compartment to permit dispersal of a material into the fluid whereby the dispersal of material into the fluid causes said floating dispersal member to be vertically displaced upward, a second plurality of openings located in said dispersant compartment to permit fluid to discharge from the bottom of said dispersant compartment as

fluid enters said dispersant compartment, said first plurality of openings spaced from said second plurality of openings to permit circulation of fluid through said dispersant compartment; and

indicating means on said dispersal member to alert a person to a condition where the dispersant reaches a predetermined quantity.

4,702,271

FLOW-CONTROL DEVICE

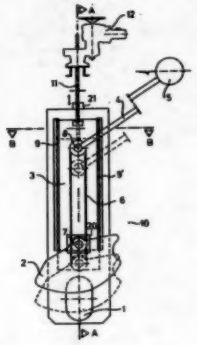
Klaus-Ulrich Giehl, Heimborn, Fed. Rep. of Germany, assignor to Lothar Steinhardt, Taunusstein, Fed. Rep. of Germany

Filed Sep. 29, 1986, Ser. No. 913,013

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535163

Int. Cl.[4] F16K *31/18, 33/00*

U.S. Cl. 137—389 **6 Claims**



1. A flow control device for a sewage system, particularly a rain basin, comprising: a sewage system with an outlet; at least one shutter element mounted rotatably on a first pivot perpendicular to said outlet; a float arm mounted rotatably on a second pivot; transmission means connecting said shutter element to said float arm, said outlet being blocked to a predetermined extent by said shutter element when said float is at a maximum height, blockage of said outlet being reduced when said float is lower than said maximum height; a common movable member carrying said first and second pivots, said first and second pivots being displaced together with movement of said common member and being held on position by said common member at a selected maximum water level; and guide means for guiding securely the movement of said common member, variation in position of said common member independent of said float movement for varying flow characteristics steplessly from said outlet during normal operation of said control device by said shutter element through a fixed relationship between said pivots and said common member, so that different outflow curves are obtained at different water levels sensed by said float.

4,702,272

VALVE DEVICE FOR INCREASING THE FUEL ECONOMY AND REDUCING THE EMISSIONS FROM AN INTERNAL COMBUSTION ENGINE

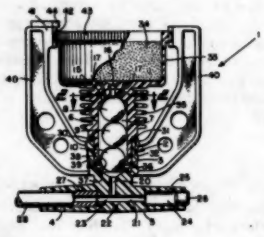
Andrew E. MacGuire, Willowdale, Canada, assignor to The Ferry Cap & Set Screw Company, Cleveland, Ohio

Filed Jun. 24, 1982, Ser. No. 391,167

Int. Cl.[4] F02M *25/00*

U.S. Cl. 137—480 **15 Claims**

1. A valve device comprising a valve chamber having a main entry orifice and an exit orifice, valve means within said chamber intermediate said main entry orifice and exit orifice responsive to a vacuum at said exit orifice to produce a substantially constant pulsating air flow through said valve, and supplemental entry orifice means communicating with said chamber for imparting a range or spread of frequencies to the pulsating air flow through said valve, said valve means including an imperforate spherical member within said chamber intermediate said



exit orifice and said main entry orifice and said supplemental entry orifice means, said supplemental entry orifice means comprising at least one supplemental entry orifice to said chamber, said main entry orifice having a greater diameter than said supplemental entry orifice.

4,702,273

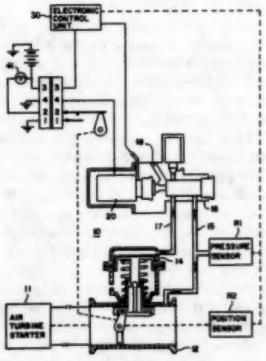
ELECTRICALLY CONTROLLED STARTER AIR VALVE

Kenneth C. Allen, Jr., Utica, and Robert H. Findlay, Hinckley, both of N.Y., assignors to Parker Hannifin Corporation, Cleveland, Ohio

Filed Mar. 7, 1986, Ser. No. 836,695

Int. Cl.[4] F16K *31/128*

U.S. Cl. 137—487.5 **3 Claims**



1. An electrically controlled starter valve comprising:

an air turbine conduit through which pressurized air can be supplied to an air turbine starter;

a butterfly valve connected to control the flow of air through said turbine air conduit and, thereby, the operation of an air turbine starter;

an air actuator mechanically connected to said butterfly valve so that air pressure in said air actuator is mechanically converted to open and close said butterfly valve;

a control air conduit connected to said air actuator;

a solenoid operated air conduit valve connected to control the flow of air through said control air conduit and, thereby, the air pressure in said air actuator, said solenoid operated air conduit valve including a solenoid which opens and closes said valve;

a pressure transducer connected to electrically sense the pressure of air in said control air conduit; and

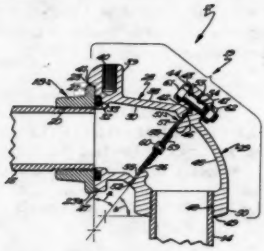
an electrical drive circuit for operating said solenoid operated air conduit valve, including an oscillator closing drive circuit which turns said solenoid on and off as said butterfly valve is closing in order to control the rate of air pressure change in said air actuator and, thereby, the rate of closing of said butterfly valve, said oscillator closing drive circuit being electrically connected to said pressure transducer so that the rate at which said solenoid is turned on and off is responsive to said pressure in said control air conduit to maintain a predetermined closing rate of said butterfly valve despite pressure changes in said control air conduit.

4,702,274

QUICK DISCONNECT FOR SEWAGE SYSTEM

Dean C. Kramer, Mason City, Iowa, assignor to Martinson Manufacturing Company, Inc., Sheffield, Iowa

Filed Jun. 17, 1986, Ser. No. 875,070
Int. Cl.[4] F16K *15/14;* F16L *37/26, 43/00*
U.S. Cl. 137—515.5 4 Claims



1. A quick disconnect coupling device for coupling a vertical discharge conduit of a sump pump to a horizontal conduit through which waste water is discharged, comprising:

a pair of coupling members coupled together in communicating relation, one of said coupling members being connected to the vertical discharge conduit of the sump pump and the other coupling member being connected to the horizontal conduit, said one coupling member comprising a pair of coupling elements connected together in communicating relation, each of said coupling elements having a substantially planar front coupling face and a substantially planar rear coupling face disposed at an angle with respect to the associated front coupling face thereof, the included angle defined between the front coupling face of one coupling element and the rear coupling face of the other coupling element being 90 degrees, whereby said one coupling member defines a 90-degree elbow,

a one-way check valve positioned between and secured to said coupling elements, said check valve comprising a flap hingedly connected between said coupling elements and being swingable to an open position in response to fluid pressure produced by the sump pump and being swingable to the closed position obstructing the flow of liquiid through the quick disconnect coupling device in the return direction, said check valve being disposed in inclined relation with respect to the horizontal conduit,

one of said coupling elements being connected in communicating relation to the vertical discharge conduit, the other of said coupling elements having vertical substantially straight guide elements integral therewith and projecting laterally outwardly from opposite sides thereof,

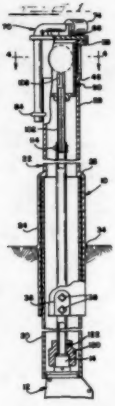
said other coupling member being of single piece construction and having a pair of vertical substantially straight guideways adjacent the marginal portions thereof and being engaged by the guide elements of said other coupling element when said coupling members are coupled together, means on the upper portion of said other coupling element engaging said other coupling member when said coupling members are in coupled relation to position said coupling members in registering relation with respect to each other.

4,702,275

POST ASSEMBLY FOR A BURIED VALVE

John V. Ballun, Plainfield, and Lorand H. Gain, Jr., Montgomery, both of Ill., assignors to AMSTED Industries Incorporated, Chicago, Ill.

Filed May 12, 1986, Ser. No. 862,466
Int. Cl.[4] F16K *37/00*
U.S. Cl. 137—556 19 Claims



1. An improved post assembly for a buried valve wherein the valve is located at one end of an access pipe, said post assembly comprising:

a post having a barrel portion to concentrically fit upon an opposite end of said pipe and a mast portion extending axially beyond said barrel portion, said mast portion having an angled cross section with multiple sides;

a cover cap hinged to an end of said mast portion beyond said barrel portion;

a plurality of windows in said mast portion near said cover cap and substantially equally distant therefrom, at least one window being in each of said multiple sides whereby a line of sight may extend through two windows from nearly any angle away from said post;

a target cup axially movable within said mast portion, said target cup having a cross section conforming substantially and being congruent to the interior cross section of said mast to thereby prevent relative rotational movement between said mast and said target;

an operating stem extending axially within said mast and into said target cup, said operating stem having an operator nut at one end located within said target cup below said cover cap and having threads along its surface, and means on said target cup to engage said threads whereby said target cup will move axially past said windows as said operating stem is turned;

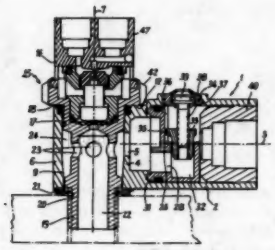
an extension tube axially connectable to said operating stem, said extension tube being of a length to extend from said stem through said access pipe to an actuator nut on said valve;

and means for detachably connecting said extension tube to said actuator nut.

4,702,276
ASSEMBLY OF CONNECTIONS FOR PNEUMATIC JACKS

Daniel Bouteille, Ville D'Avray; Michel Nicolas, Neauphle le Chateau, and Pierre Prudhomme, St. Germain en Laye, all of France, assignors to La Telemecanique Electrique, Nanterre, France

Filed Dec. 27, 1985, Ser. No. 813,782
Claims priority, application France, Dec. 28, 1984, 84 20038
Int. Cl.[4] F16L *37/28*
U.S. Cl. 137—580 **10 Claims**



1. A connecting assembly for a pneumatic jack ensuring at least two functions one of which being a one way flow rate regulation comprising:

a first hollow body having a geometric axis and elongated in a direction defined by said geometric axis, terminated at one end by an end wall, with, at said end a first channel, said body being provided at said end with a cylindrical collar having an interior and having an axis which is substantially perpendicular to said geometric axis, said first channel opening out in the interior of said collar,

a second body having a geometric axis elongated in a direction defined by said geometric axis thereof, located inside said interior of said collar and defining in said interior a second channel permanently connected to the first channel,

means for fastening said second body to said collar and said collar to the jack,

operational means housed in said connecting assembly for ensuring a regulation of the air flow coming from the jack,

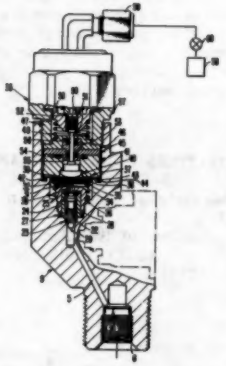
said operational means being totally housed in said first body and beyond said end with respect to said collar, while at least second operational means are housed in the second body for ensuring at least one other operation.

4,702,277
CYLINDER VALVE-REGULATOR

Louis A. Ollivier, Palo Alto, Calif., assignor to Veriflo Corporation, Richmond, Calif.

Continuation of Ser. No. 729,414, May 1, 1985, abandoned. This application Dec. 2, 1986, Ser. No. 937,461
Int. Cl.[4] F16K *31/122*
U.S. Cl. 137—613 **29 Claims**

1. A cylinder valve-regulator for mounting directly on a high pressure gas cylinder for controlling the flow of gas from the cylinder comprising means for mounting the cylinder valve-regulator directly on the high pressure gas cylinder, fluid passage means for conveying gas through the cylinder valve-regulator from an inlet for communicating with the high pressure gas cylinder to an outlet, first valve means for opening and closing the fluid passage means to control the flow of gas through the fluid passage means, and pressure regulator means for operating said first valve means so as to regulate the gas pressure in the fluid passage means downstream of the first valve means as a function of the pressure of an external control fluid applied to the pressure regulator means and upon loss of said external control fluid passage to said pressure regulator means to close said fluid passage means, wherein said pressure regulator means includes a fluid pressure operated actuator for opening said first valve means in response to the application of said external control fluid pressure to said actuator, said actuator comprising a piston-cylinder unit to which said external control fliud pressure is applied and rigid means for transmitting movement of a piston of said piston-cylinder unit to the first valve means for opening said first valve means, wherein said rigid means for transmitting movement of the piston to the

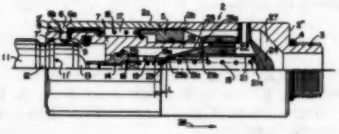


first valve means includes a movable diaphragm defining a portion of said fluid passage means downstream of said first valve means, rigid means outside of the fluid passage means for transmitting the movement of the piston to the diaphragm, and rigid means inside of the fluid passage means for transmitting movement of the diaphragm to the first valve means for opening said first valve means, said rigid means outside of said fluid passage means for transmitting movement including a pin which extends between said piston-cylinder unit and said diaphragm.

4,702,278
VALVE COUPLERS DESIGNED TO ALLOW THEIR CONNECTION DESPITE THE PRESENCE OF CONSIDERABLE RESIDUAL PRESSURE IN USER LINES

Jean-Pierre Badoureaux, Annemasse, France, assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed May 21, 1986, Ser. No. 866,023
Claims priority, application France, May 21, 1985, 85 07821
Int. Cl.[4] F16L *37/28*
U.S. Cl. 137—614.05 **11 Claims**



1. A coupling device for releasably receiving and retaining a coupling piece, comprising:

first and second sealingly joined tubular pieces, together forming a coupling body, and axially movable relative to each other between a receiving position allowing a coupling piece to be received therein and a retaining position for retaining a coupling piece therein;

a valve axially movable in said second tubular piece between a closed position preventing fluid flow through said coupling body, an open position allowing fluid flow through

said coupling body, and a position past said open position allowing sealed coupling to a coupling piece with fluid pressure therein, said valve having a valve stop thereon;

said second tubular piece having a stop mate which selectively mates with said valve stop to prevent said valve from moving past said open position; and

stop selector means cooperating with said valve stop and said stop mate responsive to the relative position of said first and second tubular pieces for selectively preventing said valve from moving to said position past said open position such that when said first and second tubular pieces are in said receiving position said valve is free to move to said position past said open position, while when said first and second tubular pieces are in said retaining position, said valve is prevented from moving to said position past said open position.

4,702,279

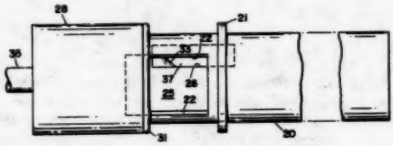
VALVE TO CONTROL THE RATE AND SHAPE OF A FLUID STREAM

John D. Giese, Berkeley, Calif., assignor to Mepaco, Inc., Oakland, Calif.

Filed Dec. 10, 1984, Ser. No. 680,175

Int. Cl.[4] F16K *5/10*

U.S. Cl. 137—625.17 **1 Claim**



1. A valve to control the volume and thickness of an elongated liquid stream comprising:

a first valve element having a first, rectangular, elongated passageway,

a second valve element having a second, rectangular, elongated passageway, said second valve element being oriented with the long axis of said second passageway parallel to the long axis of said first passageway and being in sliding contact with said first valve element, and said second valve element including a closure having a sloping surface with its base approximately at the extremity of said second elongated passageway,

means to move said second valve element in a direction parallel with the long axis of said first passageway whereby the volume of said liquid stream may be controlled, and

means to move said second valve element in a direction perpendicular to the long axis of said first passageway whereby the thickness and the volume of said liquid stream may be controlled.

4,702,280

IRRIGATION LEAKAGE PREVENTION DEVICE

Avraham Zakai, Rishon Le-Zion, and Adiel Shfaram, Doar Na Hof Ashkelon, both of Israel, assignors to Dan Mamtirim, Galil Elyon, Israel

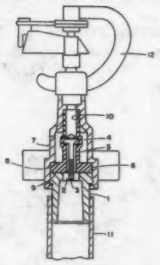
Filed Aug. 7, 1986, Ser. No. 894,253

Claims priority, application Israel, Aug. 20, 1985, 76145

Int. Cl.[4] F16K *7/02*

U.S. Cl. 137—853 **1 Claim**

1. An irrigation emitter unit comprising an emitter coupling duct designed to be coupled at one end thereof to an irrigation supply; a barrier stem formed integrally with an apertured opposite end of said coupling duct; a barrier disc formed integrally with an end of said barrier stem remote from said coupling duct; a housing member coupled to said coupling duct so as to embrace said coupling duct and surround the barrier stem; and a resiliently flexible sleeve surrounding said barrier stem and clamped at one end thereof by the interengagement of said duct and said housing member, the opposite end of said stem remaining free; the arrangement being such that with a water supply pressure less than a predetermined minimum the



central portion of the sleeve sealingly contacts said barrier disc so as to prevent throughflow whilst when the water supply pressure exceeds said minimum said central portion is resiliently displaced away from said barrier disc so as to allow throughflow.

4,702,281

CARRIER FOR ENERGY AND SUPPLY LINES

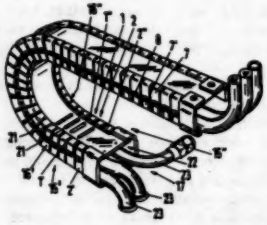
Werner Moritz, Siegen, Fed. Rep. of Germany, assignor to Kabelschlepp GmbH, Siegen, Fed. Rep. of Germany

Filed Oct. 17, 1986, Ser. No. 920,245

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1985, 3537961

Int. Cl.[4] F16L *11/18*

U.S. Cl. 138—120 **9 Claims**



1. A tube-like carrier for energy lines and other supply lines, with said carrier being disposed between a fixed connection and a movable consuming device; the carrier comprises a plurality of interlocking link members and bracket members that can be angled relative to one another; inwardly disposed link members are provided with outwardly directed stops, and outwardly disposed bracket members, which interconnect adjacent link members, are provided with inwardly directed stops, with said stops of said link members and said stops of said bracket members interlocking with one another; on the upper and lower sides of said tube-like carrier, said link members and said bracket members leave respective openings that extend in the longitudinal direction of said carrier; each of said openings is spanned in a cantilever fashion by a flexible cover strip; said carrier further comprising:

link members in the form of pairs of link members, with the link members of a given pair being disposed on opposite sides of said openings, said link members forming side walls for said carrier, with each of said link members having oppositely disposed ends;

a respective crosspiece secured to, and disposed between, the two link members of each pair of link members;

bracket members in the form of pairs of bracket members, with the bracket members of a given pair being disposed on opposite sides of said openings and interconnecting adjacent pairs of link members in such a way that the latter can be angled relative to one another; and

a pair of flexible cover strips, one spanning each of said openings, with each of said cover strips being disposed between corresponding ones of said ends of said link members, of a given pair of link members, on opposite sides of a given one of said openings.

4,702,282

REINFORCED CONVENTIONAL CONCRETE PIPE HAVING AN EVENLY DISTRIBUTED STEEL WIRE REINFORCEMENT

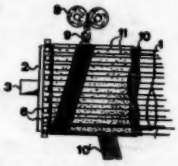
Sergio Marchesi, and Gino Fachin, both of Rome, Italy, assignors to Vianini Industria S.p.A., Rome, Italy

Division of Ser. No. 755,376, Jul. 15, 1985, Pat. No. 4,633,568. This application Aug. 8, 1986, Ser. No. 894,804

Claims priority, application Italy, Nov. 27, 1984, 49211 A/84

Int. Cl.⁴ F16L *9/00*

U.S. Cl. 138—176 **2 Claims**



1. In a reinforced concrete pipe having an evenly distributed steel wire reinforcement, the pipe having a concrete wall obtained by projecting at high speed a concentrated and homogeneous jet of concrete on a forming mandrel rotating around a longitudinal axis, and by distributing within the thickness of the wall a circumferential reinforcement comprising layers of continuous steel wires helically wound, the improvement comprising:

inclining the helix of the circumferential reinforcement wires with respect to the axis of the mandrel from 2° to 10°, the diameter of these wires being from 0.1 to 1 millimeter,

providing a longitudinal reinforcement comprising steel tensioned wires having a diameter of from 0.5 to 2 millimeters, parallel to the axis of the mandrel and distributed homogeneously in the pipe wall, the longitudinal reinforcement tensioned wires being arranged in at least one layer between two helical layers of circumferential reinforcement wires.

4,702,283

PROCESS AND APPARATUS FOR INSPECTING WOVEN FABRIC DURING ITS PRODUCTION ON ONE OR MORE LOOMS

Henri Shaw, Woesten-Vleteren, Belgium, assignor to N.V. Weefautomaten Picanol, Belgium

Filed Jun. 25, 1986, Ser. No. 878,225

Claims priority, application Belgium, Jun. 26, 1985, 2/60724

Int. Cl.⁴ D03D *51/18*

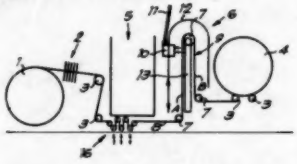
U.S. Cl. 139—348 **12 Claims**

1. A process for optically inspecting fabric woven in at least one loom between the weaving operation and the winding of the fabric on the take-up roll of the loom comprising:

(a) causing the fabric to extend over an inspection area having a defined length and width between the weaving of the fabric and the winding of same on a take-up roll of the loom;

(b) causing a moveable optical scanner to cyclically traverse the entire inspection area of said at least one loom during each inspection cycle and to generate weaving quality signals indicative of the weaving quality of the fabric extending over said inspection area;

(c) processing said weaving quality signals by at least comparing said weaving quality signals with previously established weaving quality reference values applicable to said loom and generating a weaving quality defect signal as a result of said processing whenever said comparison indicates a departure of the weaving quality signals from the weaving quality reference values.



4,702,284

METHOD AND APPARATUS FOR INSERTING WEFT THREADS INTO THE LOOM SHED OF SHUTTLELESS LOOMS

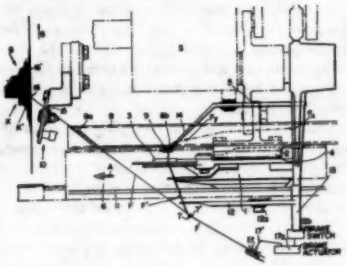
Fritz Gehring, Lindau-Bodolz, Fed. Rep. of Germany, assignor to Lindauer Dornier Gesellschaft mbH, Lindau, Fed. Rep. of Germany

Filed Jun. 30, 1986, Ser. No. 879,991

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1985, 3524727

Int. Cl.⁴ D03D *47/34*

U.S. Cl. 139—446 **13 Claims**



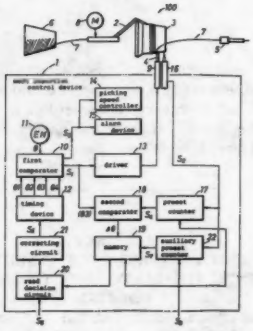
4. An apparatus for inserting a weft thread into a loom shed, comprising gripper rod means (1) movable into and out of the loom shed (K), clamping means (3) carried by said gripper rod means for seizing a weft thread (F), movable thread guide means (7) for guiding a weft thread, severing means (10) for cutting an inserted weft thread, thread end holder means (8) arranged between said severing means (10) and said clamping means (3) for presenting a thread end to said clamping means, and thread pull-back means (12) for drawing a length of thread partially back out of said thread end holder means (8) to reduce weft thread waste, said thread end holder means comprising a suction pipe (8) having a suction opening (8*a*) close to a cutting point of said severing means and a suction channel (8*b*) extending lengthwise in said suction pipe from said suction opening to a channel end in an area laterally next to said clamping means (3) in a clamping means rest position for yieldingly holding and guiding a weft thread end into said clamping means.

4,702,285

WEFT INSERTION CONTROL METHOD AND DEVICE FOR CARRYING OUT THE SAME

Katsuhiko Sugita, Kanazawa, Japan, assignor to Tsudakoma Corp., Kanazawa, Japan

Filed Apr. 4, 1986, Ser. No. 849,077
Claims priority, application Japan, Apr. 5, 1985, 60-71157
Int. Cl.[4] D03D *47/36*; B65H *51/20*
U.S. Cl. 139—452 5 Claims



1. A weft insertion control method for keeping constant the length of the weft picked in each pick by controlling the operation of a weft inserting device which measures and reserves a weft by winding the weft on a stationary measuring and reserving drum by means of a rotary yarn guide, releases the weft from and detains the same on the measuring and reserving drum by reciprocating a detaining pin relative to the measuring and reserving drum, and picks the weft wound and reserved on the measuring and reserving drum using a picking nozzle, which comprises the steps of:

(a) controlling a detaining pin, including the steps of comparing a present weft releasing angle and a reference weft detaining angle with the phase angle of the loom, retracting the detaining pin when the phase angle of the loom is at the weft releasing angle to separate the detaining pin from the circumference of the measuring and reserving drum, and advancing the detaining pin when the phase angle of the loom is at the reference weft detaining angle to bring the detaining pin into abutment with the circumference of the measuring and reserving drum;

(b) detecting the number of winds of the weft removed from the measuring and reserving drum;

(c) comparing the phase angle where the last wind of the weft is unwound from the measuring and reserving drum with the reference weft detaining angle to obtain the angular difference therebetween; and

(d) correcting the reference weft detaining angle on the basis of the angular difference obtained in the comparing step so that the angular difference is reduced to zero.

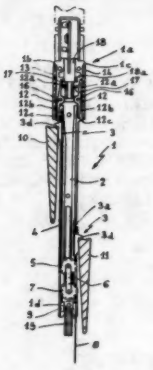
2. The weft insertion control method according to claim 1, including the steps of determining whether the corrected reference weft detaining angle is within a predetermined angular range, and controlling the picking speed when the corrected reference detaining angle is outside the predetermined range so as to control and keep constant the length of the weft being picked in each pick.

4,702,286

SHED FORMING DEVICES IN WEAVING LOOMS INCLUDING PIVOTABLE RETAINING HOOKS

Joseph Palau, Duingt, and Dario Bassi, Corbas, both of France, assignors to Etablissments Staubli-Verdol, Chassieu, France

Filed Aug. 14, 1986, Ser. No. 896,266
Claims priority, application France, Sep. 6, 1985, 85 13435
Int. Cl.[4] D03C *13/00, 3/00, 3/06*
U.S. Cl. 139—455 2 Claims



1. An apparatus for lifting the warp yarns in a shed forming device for weaving looms comprising partition means, a pair of mobile hooks oppositely oriented on opposite side of said partition means, each of said mobile hooks having a toe portion, a funicular element extending between said pair of mobile hooks so that said mobile hooks are manipulated between first and second positions by said funicular element, a pair of fixed hooks oriented in opposing relationship of opposite sides of said partition means so as to be in general alignment with one of said pair of mobile hooks, each of said fixed hooks having a head portion and a tail portion, pin means intermediate said head and tail portions of said fixed hooks for pivotally securing said fixed hooks to said partition means, an electromagnetic means carried by said partition means and adjacent said tail portions of said fixed hooks, spring means mounted between said fixed hooks and said partition means and adjacent said tail portions of said fixed hooks so as to urge said fixed hooks into a rest position in which the head portions thereof are in substantial alignment with the toe portions of said mobile hooks, each head portion of each of said fixed hooks including a nose portion which extends inwardly toward said partition means and an outermost inclined terminal edge portion, each of said mobile hooks having an elastic tongue oriented in the direction of one of said fixed hooks, each of said elastic tongues including an outer face which is offset outwardly of said toe portions of said mobile hooks, each of said toe portions of said mobile hooks including an inclined outer edge which is engagable with one of said inclined terminal edge portion of said fixed hooks to thereby pivot said fixed hooks so that the tail portions thereof are urged toward said electromagnetic means.

4,702,287

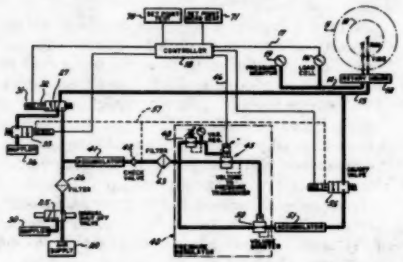
METHOD AND APPARATUS FOR CONTROLLING THE AUTOMATIC INFLATION OF TIRES FOR TESTING

Robert E. Higbie, Canton, and James C. Beebe, Medina, both of Ohio, assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Aug. 22, 1986, Ser. No. 899,996
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—4 5 Claims

4. The method of inflating a series of tires to a set test pressure comprising the steps of:

first inflating a tire to a bead seat pressure,
partially exhausting the pressure to approximately the test pressure,
inflating the tire to the test pressure as determined by a voltage-to-pressure transducer,



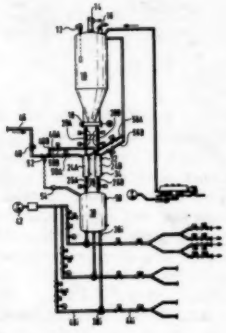
determining the difference between the actual test pressure and the set test pressure,
and correcting the voltage to the voltage-to-pressure transducer by the amount of said difference whereby the next succeeding tire will be inflated to an actual pressure closer to said set pressure.

4,702,288

APPARATUS FOR THE PNEUMATIC INJECTION OF PULVERULENT MATERIALS INTO A PRESSURIZED VESSEL, AND ITS APPLICATION TO THE INJECTION OF POWERED COAL INTO A SHAFT FURNACE

Leon Ulveling, Howald; Louis Schmit, and Edouard Legille, both of Luxembourg, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Aug. 21, 1986, Ser. No. 898,526
Claims priority, application Luxembourg, Aug. 21, 1985,
Int. Cl.[4] B65B *1/04*
U.S. Cl. 141—67 **11 Claims**



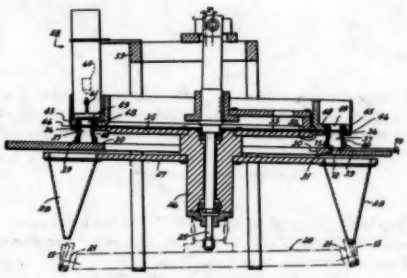
1. An apparatus for the pneumatic injection of pulverulent materials into a pressurized vessel, comprising a storage silo, a series of metering means for extracting the pulverulent material from the distribution silo, pneumatic conveying pipes connecting each of the metering means to the pressurized vessel, and also means for the automatic transfer of the pulverulent material from the storage silo, which is under substantially atmospheric pressure, to the distribution silo in which a pressure higher than that in the vessel prevails, including:
two intermediate silos, each intermediate silo being connected by first automatic valve means upstream to the storage silo and by second automatic valve means downstream to the distribution silo;
pressurizing circuit means connecting a source of inert gas under pressure through third automatic valve means to each of said intermediate silos; and
wherein said two intermediate silos are alternately connected to said storage silo and to said distribution silo to enable substantially continuous transfer of pulverulent material from said storage silo to said distribution silo.

4,702,289

VOLUMETRIC FILLER FOR POUCH MACHINE

Harold T. Benner, Jr.; Mark A. Leonhardt, both of Cincinnati, Ohio, and Matthew J. Zdinak, Erlanger, Ky., assignors to R. A. Jones & Co. Inc., Convington, Ky.

Filed Jun. 30, 1986, Ser. No. 880,066
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—125 **6 Claims**



2. In a pouch filling machine including a large rotating drum about which a web of pouches is passed to be filled by a filler above said drum as said drum rotates under said filler, said pouch filler comprising:
a stationary plate having a discharge slot therethrough extending through an arc of a circle,
a rotating primary plate connected to said drum and located immediately above said stationary plate, said rotating plate having a plurality of primary holes therethrough to form primary filling cups, said primary cups being uniformly-spaced about a circle that passes over said arcuate slot,
a rotating secondary plate spaced above said primary plate and having a plurality of secondary cups aligned above said primary cups,
a stationary hopper above said rotating plates for discharging product onto said secondary plate where it can be plowed into said secondary and primary cups,
at least one stationary separator between said rotating plates and located above said arcuate slot to hold back product in said secondary cups while product is discharging from said primary cups through said slot into pouches.

4,702,290

CONTAINER FOR COLLECTING OIL

Fernando Perez, 5101 SW. 139 Ct., Miami, Fla. 33175

Filed Nov. 10, 1986, Ser. No. 929,100
Int. Cl.[4] B65B *39/00*; B67C *11/04*
U.S. Cl. 141—332 **7 Claims**

1. A container for collecting oil from the crankcase of automobiles and for draining the oil filter, comprising:
A. container means having a bottom member and a peripheral wall upwardly extending from the outer edge of said bottom member and said wall having inner and outer surfaces;
B. cover means cooperatively and removably mounted over said wall thereby providing liquid tight sealing of said container means and said cover means including an opening; and

C. valve means mounted on said wall so that said oil may be controllably drained out;

D. first handle means mounted on said wall opposite to said valve means; and

E. support means mounted on the inner surface of said wall and adapted to hold in place said oil filters and said support means being mounted substantially where said valve means is located.

4,702,291

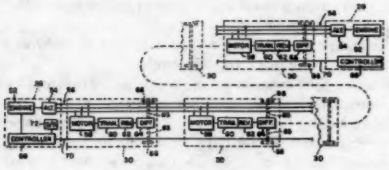
PROPULSION SYSTEM FOR INTEGRAL TRAINS

Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed Sep. 16, 1985, Ser. No. 776,766

Int. Cl.[4] B61C *7/04*

U.S. Cl. 105—35 **11 Claims**



1. A propulsion system for driving at least one axle of a rail vehicle comprising:

an engine;

means connected to said engine for generating a three phase alternating current electrical signal as a function of the speed of said engine;

a three phase alternating current motor directly responsive to said three phase alternating current electrical signal;

variable automatic mechanical transmission means coupled to said electrical motor for transmitting torque to said axle;

means for measuring vehicle speed; and

first control means for controlling the speed of said engine and controlling said variable transmission means as a function of a selected vehicle speed and measured vehicle speed.

4,702,292

HIGH PERFORMANCE ALL-SEASON TIRE TREAD

Randall R. Brayer, Uniontown, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 18, 1986, Ser. No. 840,812

Int. Cl.[4] B60C *11/11*

U.S. Cl. 152—209 R **14 Claims**

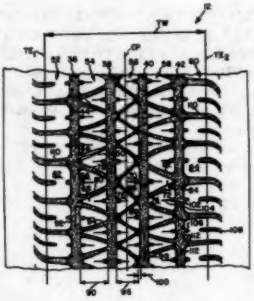
1. A pneumatic tire comprising:

(a) a pair of axially spaced apart annular beads;

(b) a radial ply carcass structure extending between said beads with an axially outer portion of the carcass structure folded about each of said beads;

(c) a circumferentially extending belt structure disposed radially outwardly of said carcass structure in a crown region of the tire; said belt structure having a pair of axial edges; and

(d) a ground engaging tread portion of elastomeric material disposed radially outwardly of said belt structure and extending circumferentially thereabout, said tread portion having a pair of axially spaced apart tread edges, said tread portion having at least four straight grooves therein which extend circumferentially thereabout, two of said circumferentially extending grooves being disposed between each of said tread edges and a mid-circumferential plane of the tire, the axially outermost. circumferential groove on each side of the mid-circumferential plane communicating with the axially outermost circumferentially extending groove on the other side of the mid-circumferential plane by means of two series of curved grooves, the grooves of said first series of curved grooves extending between said axially outermost circumferentially extending grooves in a first direction that is inclined with respect to the mid-circumferential plane and the grooves of said second series of curved grooves extending between said axially outermost circumferentially extending grooves in a second direction that is inclined with respect to the mid-circumferential plane opposite to said first direction, each of said curved grooves having a centerline which has a point of inflection of curvature located substantially at the mid-circumferential plane of the tire, each groove of said first series of curved grooves intersecting at least two grooves of said second series of curved grooves on each side of the mid-circumferential plane, each of said curved grooves communicating with each of said tread edges by means of drainage grooves extending from said axially outermost circumferentially extending grooves to the nearest tread edge in a substantially axial direction, an axially inner end of each of said drainage grooves each being aligned circumferentially with an axially outer end of one of said curved grooves; said circumferentially extending grooves, said first and second series of curved grooves and said drainage grooves cooperating to define a plurality of circumferentially extending series of individual traction elements, the ratio of circumferential length to axial width of said traction elements in a footprint of the tire being greatest for the traction elements that intersect the mid-circumferential plane and progressively less for each subsequent series of traction elements disposed between two of said circumferentially extending grooves as the axial distances of the series from the mid-circumferential plane increases.

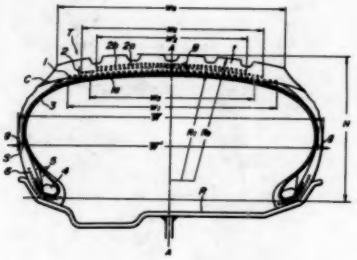


4,702,293

HEAVY-DUTY LOW-SECTION PNEUMATIC RADIAL TIRE

Norio Iwata, Amagi; Masao Nakamura, Tokyo, and Takashi Takusagawa, Ohme, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation of Ser. No. 564,046, Dec. 21, 1983, abandoned.
This application Feb. 26, 1986, Ser. No. 834,123
Claims priority, application Japan, Dec. 29, 1982, 57-230059
Int. Cl.[4] B60C *9/18, 9/28*
U.S. Cl. 152—531 20 Claims



1. A heavy duty low-section open tube type pneumatic radial tire comprising; a radial carcass toroidally extending between a pair of annular bead portions, said bead portions having a bead core and a stiffener, a belt composed of plural ply layers successively superimposed one upon the other around a crown portion of the carcass, and a tread rubber; said belt comprising a first belt layer and a second belt layer, said first belt layer composed of at least two cord plies each containing cords inclined at a small angle with respect to the equatorial plane of the tire, the cords of said plies being crossed with each other with respect to the equatorial plane, said second belt layer composed of at least one cord ply containing at least substantially non-expansible cords arranged substantially parallel to the equatorial plane and extending laterally beyond both sides of said first belt layer between the first belt layer and the carcass and having the same width as said tread rubber, and said first and second belt layers having no intermediate cushion layer therebetween.

4,702,294

VEHICLE TIRE WITH FLAT WIRE CARCASS REINFORCEMENT

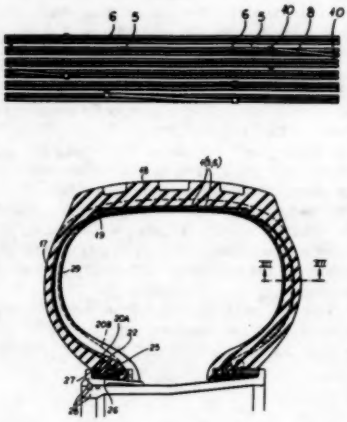
Wladislaw Kubica, Hauergasse 12, A 2410 Hainburg, Austria, and Adam Kubica, No. 1 Ofiar, Oswiecimia, Poland

Filed Mar. 7, 1986, Ser. No. 837,508
Claims priority, application Austria, Jun. 10, 1985, 1730/85
Int. Cl.[4] B60C *9/08*
U.S. Cl. 152—556 7 Claims

1. A vehicle tire, comprising:

an elastomeric tire body formed with a pair of annular tire beads along inner edges of the tire, a tread extending circumferentially along an outer periphery of the tire, and the tire carcass formed with sidewalls extending between each of said beads and said tread;

radial reinforcement for said sidewalls and formed by a plurality of stretched ring reinforcement elements each in the form of a plurality of generally spirally wound superposed turns of a flat wire, said elements being spaced apart around said body and being embedded therein with loops of each element lying in said beads and said elements extending in said sidewalls and passing inwardly of said tread; and



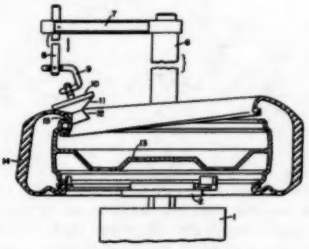
anchors in said beads passing through said loops to secure said elements, the turns of each element being fanned out away from the respective anchor toward said tread.

4,702,295

METHOD AND APPARATUS FOR MOUNTING PNEUMATIC VEHICLE TIRES

Hans Ewald, Hanover, Fed. Rep. of Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Feb. 13, 1986, Ser. No. 829,392
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504903
Int. Cl.[4] B60C *25/00, 25/08*
U.S. Cl. 157—1 16 Claims



1. A method of mounting a pneumatic vehicle tire having an inner space, the beads of which have pull resistant and compression resistant bead cores, with the beads, in the mounted state of the tire, being disposed on a wheel having a radially inwardly extending wheel flange and a radially inner periphery of the rim ring of a wheel rim next to the essentially radially inwardly extending rim flanges of the latter; said method includes the steps of:

lifting a portion of one of said tire beads over one of said rim flanges located completely in the inner space of the tire and introducing this bead portion into a mounting space on the radially inner periphery of said rim ring;

bringing a mounting means which is a non-motorized freely

rotatable member into contact with the peripheral region of said introduced tire bead portion in such a way that a first section of said mounting means rests against said tire axially outwardly of the associated rim flange that extends radially inwardly, while a second section of said mounting means rests against said tire at the level of the associated rim flange and axially inwardly of the latter, with said first and second sections defining an angle in a range of from 80° to 120° relative to one another for applying mounting forces to the tire bead portion;

while holding said introduced tire bead portion in place against said rim, guiding said mounting means along the periphery of said tire about the axis of the tire so that the tire bead portion must be pushed radially inwardly over the radially inwardly extending wheel flange;

rotating said mounting means about its own axis by engagement with the tire during said guiding of said mounting means;

removing said mounting means from contact with said tire;

turning said tire and rim over; and

repeating said procedure for the other bead of said tire.

4,702,296

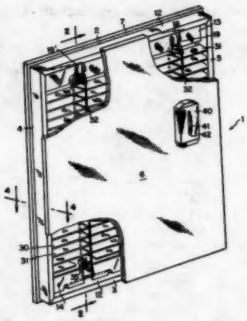
GLASS SPACER CONSTRUCTION

Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas Inc., Totowa, N.J.

Filed Apr. 25, 1984, Ser. No. 603,844

Int. Cl.[4] E06B *9/264, 3/34, 7/086*

U.S. Cl. 160—107 **4 Claims**



3. A window unit comprising at least two spaced glazings having a venetian blind assembly comprising a mat of tiltable slats having an end slat at either end thereof, said mat being mounted between said glazings and including at least one glass spacer construction between said glazings, characterized in that said spacer contruction has a body portion extending between and parallel to the edges of said glazing and a privacy strip on said body portion extending substantially the length thereof and substantially perpendicular thereto at a position on said body portion extending between and spaced from the glazings, said strip overlapping a portion of at least one of said end slats to close off any spacing between said body portion and said at least one of said end slats when said slats are in tilted position and further characterized in that said mat of slats is tiltably supported by suspension means connected to and extending between pivot bearing members, and in that said privacy strip includes bearing mountings therein for pivotally mounting a pivot bearing member.

4,702,297

FIELD INSTALLABLE ROLLING SCREEN ASSEMBLY

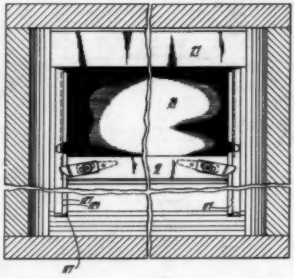
Marlo Van Klompenburg, Pella, Iowa, assignor to Rolscreen Company, Pella, Iowa

Division of Ser. No. 646,647, Aug. 31, 1984, Pat. No. 4,658,879.

This application Oct. 6, 1986, Ser. No. 896,813

Int. Cl.[4] E06B *9/17*

U.S. Cl. 160—271 **12 Claims**



1. A rolling window screen assembly installed in a window frame, said frame including a sill, a head, and side jambs, said assembly comprising:

a screen mounted on said window frame adjacent said head thereof and being unrollable along said jambs of said window frame, said screen having opposite side edges, an upper edge, a lower edge, and opposite interior and exterior surfaces;

a pair of elongated guide means mounted on and extending along each of said side jambs for guiding said opposite edges of said screen while said screen is unrolled along said jambs;

a pair of control means adjacent each side edge of said screen for frictionally engaging said guide means to control the position of said screen along said guide means;

each of said guide means including a base extending along said jamb, spaced apart front and back legs depending from said base and extending away from said jamb so as to define a screen channel therebetween, and a flange extending from said back leg;

each of said control means including a pivot pin extending through said screen adjacent said lower edge thereof, a lock member pivotally mounted on said pivot pin adjacent said exterior surface of said screen and extending around said flange on said back leg of said guide means, spring means for normally biasing said lock member into frictional engagement with said flange such that said screen is maintained in position anywhere along the length of said guide means, and a lock actuator adjacent said interior surface of said screen operatively connected to said lock member and adapted to be manually actuated to overcome the bias of said spring means such that said lock member is slidable along said flange, said spring means including a spring having first and second end portions, said first end portion engaging said screen and said second end portion engaging said lock actuator in biased opposition to said first end portion, such that said spring means automatically rotationally urges said lock member into frictional engagement with said flange at all times after said manual actuation of said lock actuator is terminated.

4,702,298

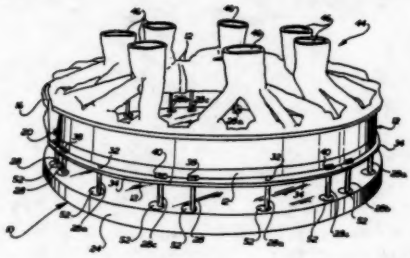
METHOD OF ASSEMBLING MOLDS

William S. Blazek, Valley City, Ohio, assignor to TRW Inc., Cleveland, Ohio

Division of Ser. No. 721,148, Apr. 9, 1985, Pat. No. 4,572,275, which is a continuation of Ser. No. 157,020, Jun. 6, 1980, abandoned, which is a division of Ser. No. 869,219, Jan. 13, 1978, Pat. No. 4,224,976. This application Oct. 23, 1985, Ser. No. 781,117

Int. Cl.[4] B22D *33/04*

U.S. Cl. 164—137 5 Claims



1. A method of assembling a mold, said method comprising the steps of providing a base, providing a plurality of upstanding pin members which are disposed in a circular array on the base and are rotatable about axes which are offset from central axes of the pin members, rotating the pin members about the axes which are offset from the central axes of the pin members to adjust the positions of the pin members relative to the base, providing a plurality of arcuate mold wall sections, and positioning the mold wall sections in a circular array on the pin members.

4,702,299

MOLD FOR CONTINUOUS CASTING AND METHOD OF MAKING

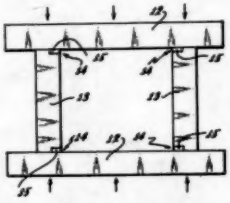
Horst Gravemann, Osnabrueck, Fed. Rep. of Germany, assignor to Kabel-und Metallwerke Gutehoffnungshuette AG, Osnabrueck, Fed. Rep. of Germany

Filed Nov. 1, 1985, Ser. No. 794,227

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1984, 3440317

Int. Cl.[4] B22D *11/04*

U.S. Cl. 164—137 12 Claims



1. In a method for making a mold for continuous casting wherein indents, grooves or recesses are provided in the mold wall itself and/or along one or more edges thereof, the mold wall being made of copper or copper alloy plates, the improvement comprising:

fitting wear-proof inserts into these grooves, recesses or indents, the inserts being made of a different material; and

fastening the inserts to the mold wall plate by means of electron beam welding along exposed joint lines between the inserts as inserted and border edges of the indents or recesses.

6. A continuous casting mold wherein a mold wall plate comprises a copper or copper-based plate having at least one indent or recess and portion or portions that will face the interior of the mold; and

an insert or inserts in said recess or recesses fitted therein, being made of a high strength, wear-proofing material and being electron beam welded for connection to the plate along a joint line between the inserted insert and the mold wall plate.

4,702,300

DOUBLE DRUM TYPE CONTINUOUS CASTING MACHINE

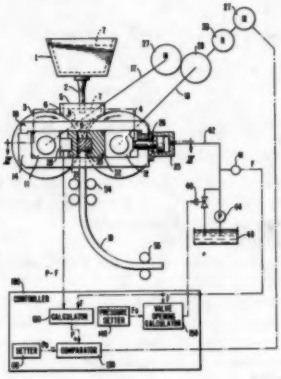
Takayuki Nakanori, Shinnanyou; Tomoaki Kimura, and Tadashi Nishino, both of Hitachi, all of Japan, assignors to Hitachi, Ltd. and Nisshin Steel Co., Ltd., both of Tokyo, Japan

Filed Mar. 11, 1986, Ser. No. 838,622

Claims priority, application Japan, Mar. 15, 1985, 60-51981

Int. Cl.[4] B22D *11/06, 11/16*

U.S. Cl. 164—154 24 Claims



1. A continuous casting machine comprising:

a pair of housing means, a container means for accommodating a molten metal, a nozzle means provided on said container means for enabling a pouring of the molten metal, a pair of rotatable roll means for cooling the molten metal poured from the nozzle means to form a solidified shell on a surface of each of said roll means and for compressing the solidified shells to produce a metal sheet, drive means for rotating the roll means, a pair of fixed plates disposed adjacent to a surface of the roll means for forming a pool of molten metal received from said nozzle means, two pair of bearing box means respectively disposed in the housing means for rotatably supporting respective end portions of each roll, a pair of rigid means disposed between adjacent bearing box means in each of said housing means for fixing a narrowest gap portion between the roll means, and means for providing an initial force to the roll means disposed adjacent to one of the bearing box means in each of the housing means to act as a clamping force on the rigid member through the associated bearing box means.

4,702,301

INSTALLATION FOR THE PRODUCTION OF HORIZONTALLY DIVIDED FLASKLESS SAND BLOCK MOLDS

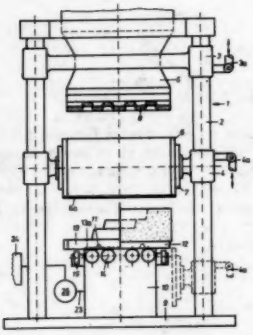
Eugen Bühler, Schleifweg 3, 8877 Burtenbach, Fed. Rep. of Germany

Filed Aug. 14, 1985, Ser. No. 765,479

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1984, 3437702

Int. Cl.[4] B22D *47/02*

U.S. Cl. 164—168 10 Claims



1. A mold making plant for producing horizontally divided, flaskless drag and cope parts of casting molds for reception on mold receiving pallets, comprising:

a vacuum molding machine;

a core insertion station connected to the vacuum molding machine;

means defining a casting and cooling path; and

further means defining a plate return path, said means defining a casting and cooling path and said further means defining a plate return path being operatively associated with each other and with the vacuum molding machine;

said vacuum molding machine comprising:

a stationary mold table provided with transporting means and centering means; a foundry sand bin; means connected to the foundry sand bin for raising and lowering said foundry sand bin relative to said table; at least one pattern plate carrier positionable on the mold table alternatively with mold receiving pallets; a mold flask; an inverter connected to the mold flask for inverting the mold flask about a horizontal axis; and means for raising and lowering the mold flask and inverter relative to the mold table, wherein:

the transporting means serves to insert and remove the pattern plate carrier and pallets with respect to the mold table;

the centering means serves to position the pattern carrier and pallets with respect to the mold table;

the mold flask is adapted to engage the pattern plate carrier in order to form a mold cavity when the pattern plate carrier is positioned on the mold table, and to be stripped when a pallet is positioned on the mold table, releasing whichever mold part is involved.

4,702,302

METHOD OF MAKING THIN ALLOY WIRE

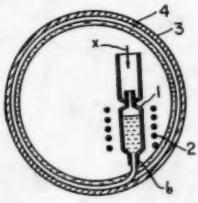
Kazuo Sawada, Osaka, Japan, assignor to Sumitomo Electric Industries Ltd., Osaka, Japan

Continuation of Ser. No. 716,137, Mar. 26, 1985, abandoned. This application Aug. 20, 1986, Ser. No. 898,835

Claims priority, application Japan, Feb. 23, 1983, 58-29969; Mar. 27, 1984, 59-59947; Aug. 22, 1984, 59-174368

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—463 4 Claims



1. A method of making an alloy wire comprising:

(a) melting an alloy, said alloy containing 0.001 through 0.5% by weight of Be, the remainder being Au;

(b) jetting the thus melted alloy into a thin wire configuration through a small opening; and

(c) curing the thus jetted alloy by moving said jetted alloy in a fluid situated along an inner surface of a cylindrical wall of a cylindrical container while rotating said cylindrical container.

4,702,303

WIDTH ADJUSTMENT OF MOLDS FOR CONTINUOUSLY CASTING SLAB INGOTS

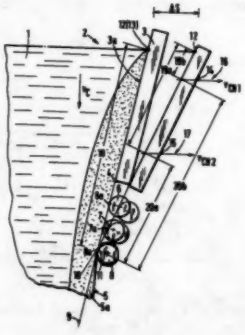
Peter Monheim, Dorsten, and Gerhard Stadtfeld, Kamp-Lintfort, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 820,407

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1985, 3501716

Int. Cl.[4] B22D *11/04, 11/16*

U.S. Cl. 164—491 4 Claims



1. Method of operating a mold for continuous casting for changing the dimensions of a casting there being at least one small side plate provided for adjustment, said plate having foot rollers underneath, in contact with the casting emerging from the mold, said adjustment including shifting and tilting of the plate comprising the steps of:

selecting a casting speed during a change of mold dimensions which speed is not lower than the one prior to the change;

first, tilting the plate including the foot rollers thereof about an axis below a low end of the plate at a level of the lowest one of the foot rollers and in a beginning of an adjusting phase;

laterally shifting said plate, said shifting to begin after the beginning of said tilting; and

second, back or return tilting of said plate about an axis, above said first mentioned axis and coinciding with a surface level of molten material in said mold, the return tilting beginning after the lateral shifting has begun.

4,702,304

FOUNDRY MOLD FOR CAST-TO-SIZE ZINC-BASE ALLOY

Hal H. Rice, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 3, 1986, Ser. No. 926,157
Int. Cl.[4] B22C *1/08*
U.S. Cl. 164—529 **2 Claims**

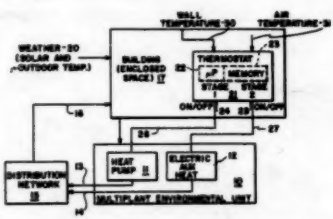
1. A method for making a foundry mold for casting a zinc-base alloy to substantially duplicate a pattern, the method comprising compacting a particulate mixture about the pattern, removing the pattern to produce a self-sustaining compact defining a cavity sized and shaped corresponding to the pattern and sintering the compact to produce a mold, said mixture being composed predominantly of alumina particles and containing raw kyanite particles in an amount between about 3.6 and 6.4 weight percent and effective to react with the alumina during sintering to expand the mold cavity by an amount within a range between about 0.7 and 1.5 percent and sufficient to compensate for post-solidification shrinkage of the alloy.

4,702,305

TEMPERATURE CONTROL SYSTEM FOR CONTROL OF A MULTIPLANT ENVIRONMENTAL UNIT

Thomas J. Beckey, Edina, and Kerry M. Kallas, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 30, 1987, Ser. No. 31,952
Int. Cl.[4] F25B *29/00*
U.S. Cl. 165—12 **14 Claims**



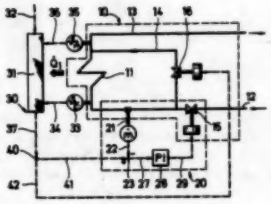
1. A temperature control system for control of a multiplant environmental unit for tempering the atmosphere in an enclosed space in an energy efficient manner, including: a multiplant environmental unit having at least a first output and a second output; said first output being more cost effective to operate than said second output; real time clock operated thermostat means located in said space; said thermostat means including means to enter selected temperatures and further including means to sense an ambient temperature in said space; said thermostat means having a selected comfort setpoint temperature, and further having a selected energy savings setback setpoint temperature to define limits of the operation of said multiplant environmental unit over a temperature control cycle; said thermostat means including microcomputer means having memory means and having two modes of operation; said memory means storing at least two operating time versus temperature curves with said curves selected to utilize said environment unit at said first output, or at both said first and said second outputs simultaneously which causes said atmosphere to change from said energy savings setback setpoint temperature to said comfort setpoint temperature with said memory including a previous temperature control cycle; said thermostat means operating said multiplant environmental unit upon said sensor temperature intersecting a first of said operating curves which energizes said first output; said sensor temperature upon intersecting a second of said operating curves operating said second output; said curves being generally parallel to one another in a first of said modes of operation; and said first of said operating curves being held fixed at a minimum slope in a second of said modes with said second of said curves being adjusted in slope to increase or decrease the operation of said second output based upon said previous temperature cycle.

4,702,306

APPARATUS FOR CONTROLLING A PROCESS VARIABLE OF A FLOWING MEDIUM

Rudolf Herzog, Tobel, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Dec. 13, 1984, Ser. No. 681,182
Claims priority, application Switzerland, Dec. 21, 1983, 6812/83
Int. Cl.[4] G05D *23/00*
U.S. Cl. 165—36 **11 Claims**



9. In combination,

a plant having a controlled section including a heat exchanger, a medium feed line connected to said heat exchanger to deliver a flow of medium thereto, a medium discharge line connected to said heat exchanger to discharge a flow of medium therefrom, a first throttle member in at least one of said lines to control the flow therethrough, a connecting line connected to and between said feed line and said discharge line in parallel to said heat exchanger and a second throttle member in said connecting line to control the flow therethrough, said first throttle member positioned in at least one of said medium feed and discharge lines so as to control the total flow of medium through both said heat exchange and said connecting line;

means for controlling a first process variable of the medium delivered to said discharge line, said means including at least two measuring members for individually measuring two different values of the first process variable and emitting corresponding signals and an observer connected to said measuring member to compare the signals therefrom and to emit a first differential signal in response to a change in the difference between said emitted signals, said observor being connected to said second throttle member to deliver said differential signal thereto to adjust the flow of medium in said connecting line; and

a control circuit for controlling a second process variable of the medium, said circuit including a third measuring member for measuring the second process variable of the medium in said feed line downstream of said connecting line and emitting a corresponding signal, a comparator connected to said observor and said third measuring means to receive and compare said corresponding signal and said

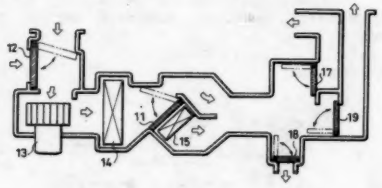
first differential signal to emit a further differential signal, a controller connected to and between said comparator and said first throttle member to adjust said first throttle member in response to said further differential signal whereby in response to said first differential signal said comparator emits a second differential signal to said controller to adjust said first throttle member in an opposite sense to said second throttle member and in subsequent response to a signal from said third measuring member said comparator emits a third differential signal to said controller to adjust said first throttle member in a reverse sense.

4,702,307

AIR CONDITIONER CONTROL SYSTEM

Akinori Ito; Michitada Akazawa, and Shiro Kondo, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Dec. 10, 1986, Ser. No. 940,514
Claims priority, application Japan, Jan. 23, 1986, 61-11176
Int. Cl.[4] B60H *3/00*
U.S. Cl. 165—42 **9 Claims**



1. An air conditioner control system for adjusting the mixing ratio of warm and cool winds by controlling the opening angle of the air mixing door of an air conditioner, comprising:

a power supply having positive and negative terminals;

a control knob made manually movable;

a base board formed thereon with a plurality of wiring concentric patterns, two of which are connected with the positive and negative terminals of said power supply, said base board being made swingable on the common center of said wiring patterns;

a pair of sliding contacts made turnable on said common center in association with the movement of said control knob for selectively contacting with said wiring patterns;

a prime mover for turning backward and forward and stopping in accordance with the contacting states between said wiring patterns and said sliding contacts; and

connecting means for providing connections between said prime mover and the air mixing door of said air conditioner and between said prime mover and said base board,

wherein the improvement resides in that said prime mover stops said base board, when said sliding contacts are located on the polarity changing point of said wiring patterns, and turns said base board to bring said sliding contacts into said polarity changing point when said sliding contacts are apart from said polarity changing point.

4,702,308

MANIFOLD

Renato R. Noe, Union City, N.J., and Abraham L. Yarden, Los Angeles, Calif., assignors to Southwestern Engineering Company, Los Angeles, Calif.

Division of Ser. No. 527,371, Aug. 26, 1983, Pat. No. 4,473,112, which is a continuation of Ser. No. 236,646, Feb. 23, 1981, abandoned. This application Sep. 11, 1984, Ser. No. 649,472
Int. Cl.[4] F28F *9/06*
U.S. Cl. 165—76 **5 Claims**

1. A manifold for a tube bundle having a tube sheet at a first end of said bundle, comprising

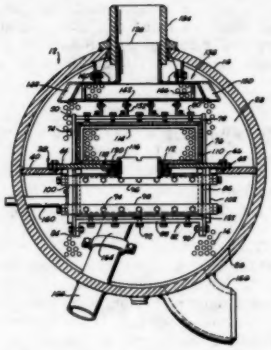
a manifold housing fixed to the tube sheet,

a baffle dividing the interior of said manifold housing,

a first frame fixed to one side of said baffle,

a second frame fixed to the other side of said baffle,

a first distribution box positioned in said first frame against the tube sheet,



a second distribution box positioned in said second frame against the tube sheet, said baffle, said first box, said second box, and said manifold housing defining four cavities in communication with the tube sheet, and

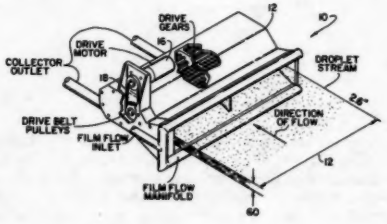
adjustable conpression members extending between said first and second frames and said first and second distribution boxes.

4,702,309

COLLECTOR FOR LIQUID DROPLET RADIATOR

Arthur M. Frank, Plainview, N.Y., assignor to Grumman Aerospace Corp., Bethpage, N.Y.

Filed Aug. 1, 1986, Ser. No. 891,894
Int. Cl.[4] F28D *15/00*
U.S. Cl. 165—104.31 **12 Claims**



1. A collector for a liquid drop radiator, for cooling at least one fluid droplet sheet, comprising:

(a) a housing having at least one inlet for the at least one fluid droplet sheet and one outlet and lying in a plane;

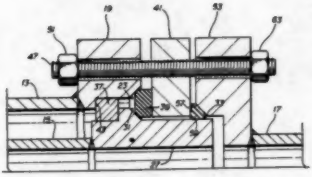
(b) a pump disposed in said housing and having a low pressure side and lying in a plane which is the same as said plane that said housing lies in, said at least one inlet of said housing converging towards said pump so that the at least one fluid droplet sheet is directed towards said low pressure side of said pump and directed by said pump to said outlet of said housing.

4,702,310

CLOSURE CONNECTION

Michael J. McDonough, Houston, Tex., assignor to Bas-Tex Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 518,547, Jul. 29, 1983, Pat. No. 4,573,527. This application Jan. 24, 1984, Ser. No. 573,481
Int. Cl.[4] F28D 7/10
U.S. Cl. 165—154 15 Claims



8. A heat exchanger closure connection, which comprises:

a tubular shell including an outwardly extending shell closure flange, said shell closure flange including an outwardly flaring frusto-conical sealing surface;

an inner tube positioned within said shell and including an outwardly extending tube closure flange, said tube closure flange having an axially extending cylindrical sealing surface about the periphery thereof having a diameter less than the inside diameter of said shell closure flange, said tube closure flange including a retaining groove intermediate the ends thereof;

a split ring assembly having an outside diameter greater than the inside diameter of said shell closure flange and positioned in said retaining groove and extending radially outwardly from said tube closure flange into abutting engagement with said shell closure flange;

a first seal ring positioned about a tube closure flange sealing surface and within said shell closure flange sealing surface in abutment with said shell closure flange;

an annular locking flange positioned about said tube closure flange and engaging said first seal ring;

means for urging said locking flange axially toward said shell closure flange thereby to interconnect said locking flange and shell closure flange and to urge said first seal ring into sealing engagement with said shell closure flange sealing surface and said tube closure flange sealing surface;

a tube end closure flange, including a frusto-conical inwardly disposed sealing surface mating with said tube closure flange cylindrical sealing surface, said tube end closure flange having a tube end extension tube extending axially away from said tube end closure flange;

a second seal ring positoned about said tube closure flange cylindrical sealing surface and within said tube end closure flange sealing surface in abuttment with said locking flange;

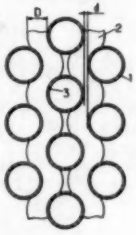
and means independent of said means for urging said locking flange axially toward said shell closure flange for urging said tube end closure flange axially toward said locking flange, thereby to interconnect said locking flange and tube end closure flange and to urge said second seal ring into sealing engagement with said tube end closure flange sealing surface and said tube closure flange cylindrical sealing surface.

4,702,311

METHODS AND DEVICES FOR FASTENING BUNDLES OF TUBES TOGETHER

Andre Bizard, Paris, France, assignor to Technos et Compagnie, Paris, France

Filed Apr. 29, 1986, Ser. No. 857,225
Claims priority, application France, May 3, 1985, 85 06774
Int. Cl.[4] F28D 7/00
U.S. Cl. 165—162 4 Claims



1. A device for assembling together a bundle of parallel tubes (1), comprising flexible sealed pipes (2) inserted jointingly between the successive layers of these tubes, said pipes having sufficient elasticity for being successively flattened by evacuation of their inner volume, which allows positioning thereof in the bundle, then resuming their initial tubular shape by suppression of the vacuum, characterized in that they are made from a polymer material having a degree of crystallinity between 5 and 40% and a vitreous transition point less than or equal to 100° C.

4,702,312

THIN ROD PACKING FOR HEAT EXCHANGERS

Melvin H. Brown, Allegheny Township, Westmoreland County, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Jun. 19, 1986, Ser. No. 876,113
Int. Cl.[4] F28F 1/40
U.S. Cl. 165—179 19 Claims

1. A method of increasing the heat transfer of a fluid passing along a surface at a temperature of at least about 1,000° F. comprising:

(a) establishing a thin rod packing positioned substantially normal to the flow of said fluid along said surface, wherein said packing comprises a material having an absorptance and an emittance of at least about 0.5%; and

(b) providing a substantially unobstructed line of sight between said packing and said surface.

4,702,313

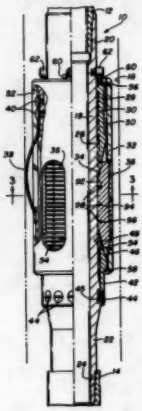
SLIP AND SLIP ASSEMBLY FOR WELL TOOLS

Donald R. Greenlee, Cedar Hill, and Lee M. Luttig, Garland, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed May 28, 1985, Ser. No. 738,214
Int. Cl.[4] E21B 23/00
U.S. Cl. 166—216 8 Claims

1. An improved gripping slip member comprising an elongated body having:

a convex top surface;
a concave lower surface with concave end portions of said lower surface forming surfaces
tapering toward said top surface; semicircular end surfaces;



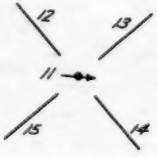
spaced lug portions projecting outwardly from a pair of side surfaces; and,
a plurality of holes extending along arcuate paths therethrough intersecting said side surfaces.

4,702,314

PATTERNS OF HORIZONTAL AND VERTICAL WELLS FOR IMPROVING OIL RECOVERY EFFICIENCY

Wann-Sheng Huang, and Margaret A. Hight, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,702
Int. Cl.[4] E21B *43/30*
U.S. Cl. 166—245 **9 Claims**



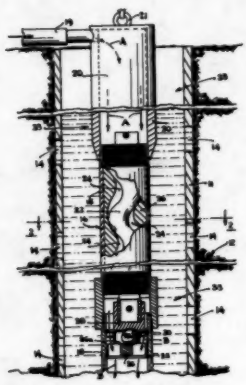
1. A method of recovering hydrocarbons from an underground formation by employing a modified 5 spot well pattern, which comprises:
a substantially vertical central injection well located at approximately the center of a substantially rectangular modified 5 spot well pattern; and
four substantially horizontal production wells, each horizontal well having one end located relatively near the vertical central well and the other end located relatively near each of the four corners of the substantially rectangular well pattern,
said wells perforated so that at least 30 feet of distance exists between perforation intervals of different wells.

4,702,315

METHOD AND APPARATUS FOR SONICALLY STIMULATING OIL WELLS TO INCREASE THE PRODUCTION THEREOF

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Aug. 26, 1986, Ser. No. 900,587
Int. Cl.[4] E21B *43/25*
U.S. Cl. 166—249 **5 Claims**



1. A method for stimulating the flow of effluent from a formation surrounding a well casing having perforations formed therein for passing the effluent into the casing comprising the steps of:
lowering a positive displacement moyno sonic oscillator into the well casing to the region of said formation so it is suspended freely therein,
feeding a stream of liquid down said well casing to said oscillator so as to rotatably drive said oscillator to effect the radiation of gyratory quadrature sonic vibrational energy therefrom,
discharging the liquid from said oscillator into said well casing such that such liquid builds up in said well casing a substantial distance above said oscillator and establishes a liquid annulus around the oscillator forming a substantial hydrostatic head in the region of said oscillator,
adjusting the rate at which said stream of fluid is fed to said oscillator to bring the vibrational output of said oscillator to a predetermined frequency and to establish and maintain said substantial hydrostatic head in the region of said oscillator thereby to effect the transfer of high level sonic energy from said oscillator through said liquid to said formation, and
continuing to feed said liquid to said oscillator until the formation is permeated as indicated by a substantial lowering of the level of said hydrostatic head.

4. A system for stimulating the flow of effluent from a formation surrounding a well casing having perforations formed therein for passing the effluent from the formation into the casing comprising:
a moyno positive displacement oscillator,
pipe string means attached to said oscillator for suspending said oscillator within said well casing in the region of said perforations and said formation, and
means for feeding a stream of liquid through said pipe string to said oscillator at a predetermined rate to drive said oscillator to effect the generation thereby of gyratory quadrature sonic vibrational energy,
the liquid stream passing through said oscillator into the well casing and forming a body of liquid in the space between the oscillator and the well casing, said liquid body rising in said casing above the oscillator to establish a liquid annulus around the oscillator forming a substantial hydrostatic head in the region of the oscillator,

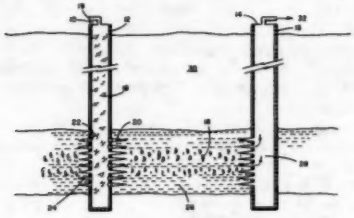
whereby sonic energy is coupled from said oscillator through the body of liquid to the formation to cause the permeation thereof thereby enhancing the flow of effluent therefrom.

4,702,316

INJECTIVITY PROFILE IN STEAM INJECTION WELLS VIA BALL SEALERS

Harold S. Chung, Princeton, N.J.; Alfred R. Jennings, Jr., Plano, and Edwin T. Strom, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 3, 1986, Ser. No. 816,095
Int. Cl.[4] E21B *33/138, 43/24*
U.S. Cl. 166—272 **7 Claims**



1. A method to control the injection profile in a steam injection well which has at least two perforations fluidly connected with zones of different permeabilities in a hydrocarbonaceous fluid bearing formation comprising:

(a) downwardly flowing into said well a carrier liquid having ball sealers suspended therein, said ball sealers having a density less than the density of said carrier liquid while being of sufficient size to plug said perforations and of a composition sufficient to withstand the steam injection temperature and pressure conditions encountered down hole;

(b) maintaining the flow velocity of said carrier liquid at a rate sufficient to to overcome the buoyancy of said sealers and sufficient to transport said sealers to the perforations thereby closing off at least one zone of high permeability; and

(c) thereafter injecting steam of a flow and pressure sufficient to keep said sealers seated on the perforations which causes said steam to enter a zone of lesser permeability, while driving said carrier liquid ahead of said steam, and which drive hydrocarbonaceous fluids to a production well for removal therefrom.

4,702,317

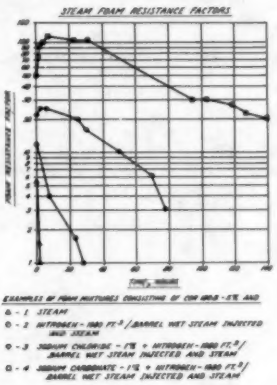
STEAM FOAM FLOODS WITH A CAUSTIC AGENT

Chin W. Shen, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Sep. 2, 1986, Ser. No. 902,542
Int. Cl.[4] E21B *43/24*
U.S. Cl. 166—272 **21 Claims**

1. A process for recovering hydrocarbons from an underground hydrocarbon formation penetrated by at least one injection well and at least one production well, which comprises:

injecting into an injection well a mixture of steam, about 5 cubic feet to about 10,000 cubic feet of a noncondensable gas per barrel of steam in the injected mixture, about 0.01% to about 10% by weight of a foaming agent based upon the weight of the steam in the injected mixture, and about 0.01% to about 10% of a caustic agent based upon the weight of steam in the injected mixture, said caustic agent selected from the group consisting of sodium carbonate, sodium bicarbonate, potassium carbonate, sodium hydroxide, potassium hydroxide, ammonium hydroxide, sodium silicate, and sodium orthosilicate; and



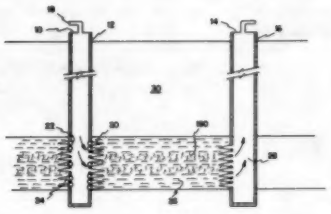
recovering hydrocarbons and other fluids from a production well.

4,702,318

INJECTIVITY PROFILE IN CO_2 INJECTION WELLS VIA BALL SEALERS

Harold S. Chung, Princeton, N.J.; Alfred R. Jennings, Jr., Plano, and Edwin T. Strom, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 9, 1986, Ser. No. 849,639
Int. Cl.[4] E21B *33/138, 43/16*
U.S. Cl. 166—274 **6 Claims**



1. A method to control the injection profile in a CO_2 injection well which has at least two perforations fluidly connected with zones of different permeabilities in a hydrocarbonaceous bearing formation comprising:

(a) downwardly flowing into said well a carrier liquid having ball sealers suspended therein, said ball sealers having a density less than the density of said carrier liquid while being of sufficient size to plug said perforations and of a composition sufficient to withstand the CO_2 injection temperature;

(b) maintaining the flow velocity of said carrier liquid at a rate sufficient to overcome the buoyancy of said sealers and sufficient to transport said sealers to the perforations thereby closing off at least one zone of high permeability; and

(c) injecting CO_2 a flow and pressure sufficient to keep said sealers seated on the perforations which causes said CO_2 to enter a zone of lesser permeability driving said carrier liquid ahead of said CO_2, and which drive hydrocarbonaceous fluids to a production well for removal therefrom.

4,702,319

ENHANCED OIL RECOVERY WITH HYDROPHOBICALLY ASSOCIATING POLYMERS CONTAINING SULFONATE FUNCTIONALITY

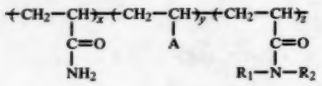
Jan Bock, Bridgewater; Paul L. Valint, Asbury, and Salvatore J. Pace, Glen Gardner, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 29, 1986, Ser. No. 947,285
Int. Cl.[4] E21B *43/22*
U.S. Cl. 166—275 **10 Claims**

1. A water flooding process for the secondary recovery of oil from a production well comprising injecting an aqueous solution under pressure to force oil to the production well, said aqueous solution comprising:

(a) water; and

(b) about 100 to about 5,000 ppms of a water soluble polymer having the formula:



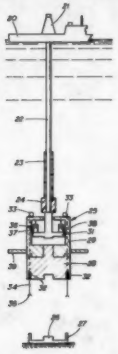
wherein R_1 is a C_6 to C_{22} straight chained or branched alkyl or alkylcycloalkyl group; R_2 is hydrogen or a C_6 to C_{22} straight chained or branched alkyl or cycloalkyl group or a C_1 to C_3 straight chained or branched alkyl group; and A is selected from the groups consisting of $SO_3^-M^+$, phenyl-$SO_3^-M^+$, and $CONHC(CH_3)_2CH_2SO_3^-M^+$, wherein n^+ is an alkali metal or ammonium cation, wherein x is about 5 to 98 mole percent, y is about 2 to about 95 mole percent, z is about 0.1 to about 10.0 mole percent.

4,702,320

METHOD AND SYSTEM FOR ATTACHING AND REMOVING EQUIPMENT FROM A WELLHEAD

John C. Gano, Carrollton; Kenneth L. Schwendemann, Lewisville; Timothy J. Noack, Grapevine, and Craig W. Godfrey, Carrollton, all of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Jul. 31, 1986, Ser. No. 891,391
Int. Cl.[4] E21B *33/035, 33/038*
U.S. Cl. 166—343 **36 Claims**



1. A system for installing subsea devices comprising,

wellhead means including a plurality of upwardly extending first guide means,

equipment means to be landed including frame means having second guide means cooperable with said first guide means to align said frame means with said wellhead means,

a plurallity of draw down means carried by one of said frame means and said wellhead mena sand having means releasably attached to the other of said frame means and said wellhead means to draw said frame means and engage said first and second guide means,

said equipment means includes upper and lower sections releasably secured together,

said frame means includes upper and lower frame means,

said lower frame means supports said lower equipment section,

said upper equipment section slidably supported on said upper frame means, and

yieldable urging means connected between said upper frame means and said upper equipment section and yieldably urges said frame means and said lower equipment means upwardly with a force at least equal to the downward force exerted by said frame means and said lower equipment means.

24. The method of connecting equipment to a wellhead comprising,

suspending an equipment frame from a flexible riser pipe carried on a reel on a vessel,

positioning the equipment frame above the wellhead,

attaching pull down cables between the the equipment frame and wellhead,

reeling in pull cables while paying out riser pipe from the vessel and landing said equipment frame on said wellhead, and

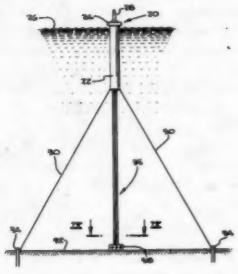
while reeling in said cables, urging said equipment frame upwardly relative to said riser pipe by a force at least as great as the downward force exerted by said equipment frame in a motion compensator permitting relative movement between the riser pipe and equipment frame.

4,702,321

DRILLING, PRODUCTION AND OIL STORAGE CAISSON FOR DEEP WATER

Edward E. Horton, 85 Vanderlip Dr., Portugese Bend, Calif. 90274

Filed Sep. 20, 1985, Ser. No. 778,496
Int. Cl.[4] B63B *35/44;* E02D *5/74;* E21B *7/12, 43/01*
U.S. Cl. 166—350 **21 Claims**



21. In a deep water offshore apparatus for use in drilling, production and oil storage, the combination of:

an elongated caisson having an upper end portion above the water surface and a lower end portion extending to a water depth subject to only minimal excitation forces caused by wave action,

said caisson having an outer surface of uniform configuration for the entire length of said caisson and providing uniform water plane area,

said length of said caisson below said water plane area providing a caisson natural period in excess of a selected maximum expected wave period;

said caisson including a central well open at the bottom of the casing;

means in said caisson for providing liquid storage compartments;

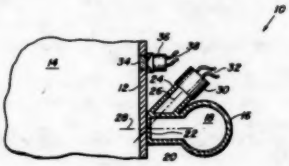
a plurality of production risers arranged in said central well;
a buoyant means for each riser in the upper portion of said central well for supporting and tensioning each riser, said buoyant means being adjacent the upper portion of said caisson and the water plane area;
mooring means attached to the lower portion of the caisson for anchoring said caisson to a sea bed;
and ballast means at the lower end portion of the caisson for maintaining the center of gravity of said caisson below the center of buoyancy thereof.

4,702,322

EXPLOSION SUPPRESSION SYSTEM

Steven D. Richardson, St. Louis County, Mo., assignor to The United States of America as represented by the Secretary of the Navy

Filed Jul. 25, 1986, Ser. No. 891,810
Int. Cl.[4] A62C *35/02*
U.S. Cl. 169—28 **4 Claims**



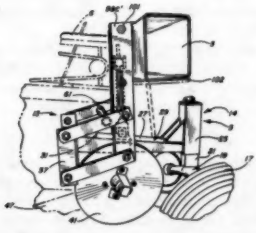
1. A device for suppression of fire or explosion in a fuel tank having a tank wall, said device comprising:
a flask or bottle for confining a fire suppressant medium under pressure, said bottle having a primary duct terminating in an end wall disposed against an external surface of said tank wall;
a secondary duct extending at an angle from said primary duct;
a charge of a fire suppressant medium contained under pressure in said bottle; and
pyrotechnic means, disposed at the outer end of said secondary duct for explosively cutting through said end wall and a portion of said tank wall in registration therewith for releasing said fire suppressant medium into said tank.

4,702,323

RIDGE TILLAGE ATTACHMENT FOR PLANTERS

Edward H. Smit, Sheffield; Charles E. Sukup, and Eugene G. Sukup, both of Dougherty, all of Iowa, assignors to Sukup Manufacturing Company, Sheffield, Iowa

Filed Jan. 13, 1986, Ser. No. 818,481
Int. Cl.[4] A01B *39/08, 39/14*
U.S. Cl. 172—156 **30 Claims**



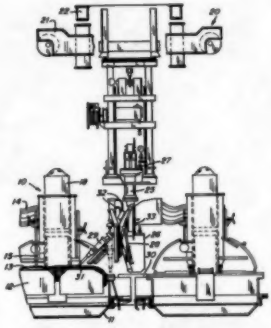
1. A planter having a plurality of row-planter units and a plurality of ridge tillage units for clearing said ridges for planting thereon by said planter units, each ridge tillage unit comprising
a linkage system;
a tool portion attached to said linkage system, including a longitudinally extending tool beam having mounted thereon a support assembly including ground-engaging wheel means and ridge clearing means for clearing said ridge of debris, said tool beam including a first tool beam portion affixed to said linkage system and a second tool beam portion on which said support assembly and said ridge clearing means are mounted, said second tool beam portion being detachably mounted on said first tool beam portion;
said linkage system including support means above said tool beam and pivot links for accommodating upward and downward movement of said tool beam relative to said support means; and
pressure means confined between said support means and said tool beam above said ridge clearing means for applying down pressure to said tool portion.

4,702,324

CONTROL SYSTEM FOR POSITIONING AND OPERATING A PNEUMATIC PERCUSSION TOOL

Dale R. Peinecke, Glenshaw, Pa.; Casimir B. Robak, Jr., Newburgh, Ind., and Robert A. Dubs, Rochester, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed May 14, 1984, Ser. No. 609,857
Int. Cl.[4] E21B *15/04*
U.S. Cl. 173—39 **16 Claims**



1. A control system for concurrently controlling at least two valve stems, comprising
(a) a first valve stem, a generally horizontal first plate connected to said first valve stem and first track means guiding said first plate for movement along a y-axis, said first plate defining a first orifice extending through the plate and having a pair of opposed internal first side walls, said first side walls being elongated parallel to an x-axis that is non-parallel to the y-axis,
(b) a second valve stem, a generally horizontal second plate connected to said second valve stem and second track means guiding said second plate for movement along the x-axis, said second plate defining a second orifice extending through the plate and having a pair of opposed internal second side walls, said second side walls being elongated parallel to the y-axis,
(c) a generally vertical control arm extending through said first orifice and said second orifice, whereby y-directional movement of said control arm is translated through said first plate into y-directional movement of said first valve stem, and x-directional movement of said contol arm concurrently is translated through said second plate into

x-directional movement of said second valve stem, said control arm comprising

(1) an elongated hollow generally vertical shaft,

(2) a rod interior of said shaft and having an upper end portion adjacent to a button extending above the shaft and a lower end portion extending below the shaft, and

(3) spring means biasing said rod upwardly,

(d) a fixed bracket attached to said control arm below said plates, said control arm including a handle above said plates, said control arm being pivotally movable upon application of manual force to the handle, and

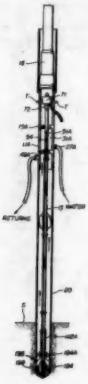
(e) an actuating pin for a pneumatic control valve, said pin being adjacent to and downward of the lower end portion of the rod, said actuating pin energizing the pneumatic control valve upon application of sufficient manual force on the button to move the rod and actuating pin downwardly.

4,702,325

APPARATUS AND METHOD FOR DRIVING CASING OR CONDUCTOR PIPE

James Hipp, 110 Leitmeyer, New Iberia, La. 70560, assignor to James Hipp, New Iberia, La.

Filed Oct. 4, 1984, Ser. No. 657,970
Int. Cl.[4] B25D *17/14*
U.S. Cl. 173—64 **17 Claims**



1. Apparatus for driving casing or conductor pipe into the ground comprising in combination;

a casing or conductor pipe adapted to be driven into the ground and having an internally disposed support shoulder at the bottom portion thereof,

reciprocal impact driving means supported atop said casing or conductor pipe for applying percussive force thereto,

a drill string assembly supported upon said support shoulder within said casing or conductor pipe for drilling a hole at the bottom thereof, said drill string supported within said casing or conductor pipe a sufficient distance beneath said impact driving means to substantially reduce the effects of percussive action imparted to said casing or conductor pipe by said driving means,

a drill bit connected to the lower end of said drill string assembly,

a fluid driven drilling means reasonably connected to said drilling string assembly for imparting rotary motion thereto independently from the movement of said casing or conductor pipe, and

means associated with said drill string assembly for creating a fluid pressure differential between the interior and the exterior of said drill string assembly to evacuate drilling debris and cuttings from the drilled hole,

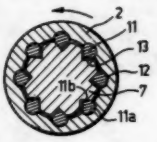
said driving means and said drilling means operative simultaneously or sequentially.

4,702,326

COUPLING ARRANGEMENT FOR A DRILL SHANK OF A PERCUSSION DRILLING MACHINE

Pekka Salmi, Tampere, and Timo Muuttonen, Nastola, both of Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed Jun. 7, 1985, Ser. No. 742,464
Claims priority, application Finland, Jul. 3, 1984, 842674
Int. Cl.[4] B23B *45/16*
U.S. Cl. 173—104 **9 Claims**



1. A coupling arrangement of a percussion drilling machine, comprising:

a shank unrotably attached to a frame bushing, the frame bushing being mounted within a frame for rotation by rotating means,

a plurality of axial driving grooves facing the shank being provided within the frame bushing,

a plurality of axial counter grooves facing the frame bushing being provided within the shank,

a plurality of wedge shaped pieces positioned within groove arrangements, each said groove arrangement being defined by at least one said driving groove and corresponding counter groove facing each other, counter surfaces of each groove arrangement adapted to closely receive the wedge shaped piece, the counter surfaces of each groove arrangement directly participating in transmitting a rotational movement from the frame bushing to the shank,

in a cross-section each wedge shaped piece having at least one arched surface and at least one substantially planar surfaces each starting at an end of the arched surface, said two planar surfaces converging towards each other in a wedge like manner,

each wedge-shaped piece being rotatable about a longitudinal axis thereof within the counter surfaces of its respective groove so that during rotation of the shank by the frame bushing each of said wedges can rotate therein until at least one of said planar surfaces and said arched surface are in uniform contact with their respective counter surfaces of the groove arrangement, whereby said wedges can compensate for worn or mishaped grooves.

4,702,327

CORE SAMPLE TAKING BULLET CONSTRUCTION

Bracell P. Barrett, Bellaire, Tex., assignor to Barrett Machine Works, Houston, Tex.

Continuation-in-part of Ser. No. 410,524, Aug. 23, 1982, abandoned. This application Aug. 30, 1984, Ser. No. 645,696
The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.
Int. Cl.[4] E21B *49/02*
U.S. Cl. 175—4 **25 Claims**

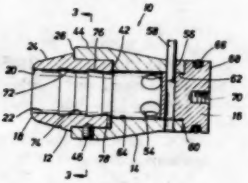
1. In a formation sampling bullet adapted to be fired at high speed by an explosive charge from a support apparatus into an earth formation adjacent to a well borehole to penetrate the formation with a nose portion to obtain and hold a formation sample core in a longitudinal bore extending rearwardly from said nose member portion of said bullet, the bullet comprising:

(a) an initial contact nose portion of a bullet forward of a longitudinal bore terminating at a circular opening of

specified diameter at said nose portion, said nose portion defining a cutting means around said opening to cut a sample core entering into said bore;

(b) an encircling wall surrounding said longitudinal bore to define said bore which bore extends to the rear of said cutting means;

(c) an internal cylindrical surface defining said longitudinal bore, said bore having a forward bore portion of right cylindrical configuration serially connected with an intermediate storage bore portion and wherein said intermediate bore portion opens into a rear bore portion adapted to receive an insertable closure means therein;



(d) an outer face behind said cutting means for contacting the formation on entry of said nose portion into the formation and said outer face defining an enlarged taper portion behind said nose portion;

(e) said nose portion in longitudinal sectional view, being a rounded surface intersecting said outer face and said internal cylindrical surface;

(f) release ring means surrounding said outer face; and

(g) retainer means for holding said release ring means initially on said outer face during entry of said bullet into the formation.

4,702,328

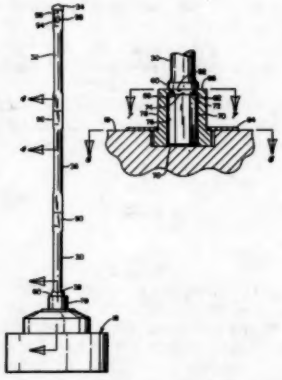
ROOF DRILLING SYSTEM

Lawrence H. McSweeney, and Larry J. McSweeney, both of Rte. 1, Box 800, South Point, Ohio 45680

Filed Nov. 22, 1985, Ser. No. 800,689

Int. Cl.[4] F21B *17/00*; B23B *31/04*

U.S. Cl. 175—320 **20 Claims**



1. In roof drilling systems for use in subterranean mining applications wherein a drill head is selectively driveably elevated from and lowered to floor level along a drill axis and includes a rotatably driven chuck having a receiving cavity of fixed peripheral dimension for slideably receiving and laterally abuttably engaging for rotation about said drill axis the driven lowermost part of the drive-in portion of an elongate rod component of roof drill steel, the improvement comprising;

a drill steel assembly component having an elongate portion fixed to and extending from a said drive-in portion, said drive-in portion being configured having a said driven lowermost portion of predetermined non-circular profile and given maximum cross-sectional dimension, said driven lowermost portion extending a predetermined length to a neck portion fixed thereto and having a maximum cross-sectional dimension less than said driven lowermost portion maximum cross-sectional dimension to define a first bearing surface therebetween, said neck portion extending from said first bearing surface and fixed to said elongate portion;

said drill head receiving cavity being configured having a right cross-sectional profile for providing, a predetermined extend of rotational lost motion freedom about said drill axis with respect to said driven lowermost portion non-circular profile when the latter portion is inserted thereinto;

means for locking the chuck to the drill head;

means for locking the chuck and drill steel together, said means for locking the chuck and drill steel comprising a flange on the chuck having a non-circular aperture formed therein, the profile of which is configured to slideably insertably receive said driven lowermost portion of said drive-in portion, the lowermost surface of said means for locking the chuck and drill steel providing a second bearing surface abuttable against said first bearing surface when said drill head is lowered, whereby said elongate rod component of drill steel may be driveably removed from a bore formed thereby; and

the chuck and drive-in portion including an impact area to prevent relative rotation of the two, said impact area being about 0.65 square inches within said chuck below said second bearing surface.

4,702,329

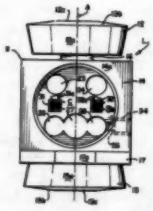
LOAD CELL

Billy J. Click, 2619 Tradewind Dr., Lake Havasu City, Ariz. 86403

Filed Mar. 4, 1986, Ser. No. 835,934

Int. Cl.[4] G01G *3/14*; G01L *1/22*

U.S. Cl. 177—211 **8 Claims**



1. A load cell for measuring axially applied loads comprising, in combination, a unitary body of resilient material having a longitudinally extending central axis corresponding to the direction of an applied load, said body including an end portion at opposite ends and an intermediate portion between said end portions, said intermediate portion having a substantially rectangular, cross-sectional shape to provide a pair of oppositely disposed side faces, each of said side faces having an inwardly extending recess forming a longitudinally extending central web therebetween having oppositely disposed side walls associated with a respective one of said recesses, said central web having a plurality of bores extending transversely therethrough and defining a central area on each of said side walls and means mounted on each of said side walls within said central area for sensing the strain induced in said central web

during the application of a load along said longitudinal axis of said load cell,

wherein said recesses are of circular cross-sectional shape and wherein said plurality of bores include an upper set of bores in said central web adjacent one of said end portions and a lower set of bores in said central web adjacent the other of said end portions, and

wherein said upper set of bores in said central web include a pair of spaced-apart bores and wherein said lower set of bores in said central web include three of said bores.

4,702,330

HYDRAULIC BRAKING AND STEERING BRAKE SYSTEM

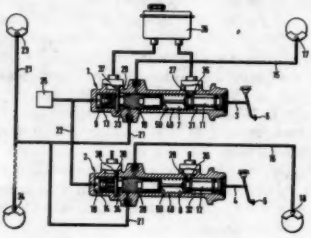
Waldemar Vatter, Laubach, and Franz Exner, Muehlheim, both of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed May 14, 1984, Ser. No. 609,767

Claims priority, application Fed. Rep. of Germany, May 14, 1983, 3317611

Int. Cl.[4] B60K *17/30*

U.S. Cl. 180—6.2 **17 Claims**



1. A hydraulic and steering brake system adapted for use with a vehicle, comprising two master cylinders operable singly or jointly by way of separate brake pedals, in which each said master cylinder includes a primray piston and a secondary piston each slidably disposed in a bore including a primary pressure chamber between said primary piston and said secondary piston and a secondary pressure chamber between said secondary piston and a closed end of the bore, the primary pressure chambers each connected to a first equalizing chamber by way of a first channel between each said primary pressure chamber and said first equalizing chamber and the secondary pressure chamber each connected to a second equalizing chamber by way of a second channel between each said secondary pressure chamber and said second equalizing chamber, means operable upon actuation of the primary and secondary pistons from a release position of the respective master cylinders toward a braking position to disconnect each said primary and secondary pressure chamber from said respective first and second equalizing chamber including a closing member disposed between each of said first and second channels and each of said respective primary and secondary pressure chambers associated with said channels, the secondary pressure chambers interconnected through an equalizing line and the primary pressure chambers are respectively connected to steering-brakeable brakes on wheels at opposite sides of the vehicle, the primary pressure chambers interconnected through a pressure line and valve means associated with each master cylinder for establishing a pressure connection between the primary pressure chambers in the event that the two master cylinders are actuated simultaneously, and for hydraulically separating said primary pressure chambers in the event that only one of the master cylinders is actuated, said valve means for each master cylinder includes a valve member disposed in the bore between the primary and the secondary pistons of the master cylinder, said valve means adapted to be open in both the release position and the braking position, wherein both master cylinder primary pistons occupy substantially an identical relative axial position in said bore of its respective master cylinder, whereby said pressure medium connection of the primary pressure chambers is established therebetween through said valve means and said pressure line, said valve member includes seal means responsive upon actuation of only one if said primary pistons toward the braking position, wherein only one master cylinder is actuated, for sealing off in a pressure-tight manner the pressure medium connection between the primary pressure chamber associated with said master cylinder that is actuated and the primary pressure chamber of the other master cylinder.

4,702,331

SELF-TRAVELING MACHINE

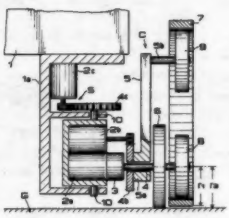
Siro Hagihara; Sadahiro Tsutani, and Yoichiro Maeda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 23, 1986, Ser. No. 854,880

Claims priority, application Japan, May 28, 1985, 60-114643

Int. Cl.[4] B62D *11/06*

U.S. Cl. 180—9.32 **7 Claims**



1. A self-traveling machine comprising:

a machine body;

a plurality of crawler units, each of the units comprising:

an endless belt entrained on a drive sprocket and an idler sprocket, said drive sprocket being fixed to a drive shaft operatively connected to a first drive motor for driving said endless belt, and

a crawler support arm pivotally supported at one end about said drive shaft and carrying at the other end said idler sprocket for free rotation, said arm being operatively connected to a second drive motor for angular movement; and

a steering mechanism supported on said machine body for angularly changing the direction fo said drive shaft and hence said drive sprocket so as to orientate the traveling direction of the machine.

4,702,332

ATTACHMENT OF SKIRT PANTS FOR SURFACE-EFFECT VEHICLES

Mark E. Prentice, Chippenham, England, assignor to Avon Industrial Polymers Limited, Wiltshire, England

Filed Nov. 8, 1985, Ser. No. 796,544

Claims priority, application United Kingdom, Nov. 9, 1984, 8428391

Int. Cl.[4] B60V *1/04*

U.S. Cl. 180—127 **11 Claims**

1. A skirt element for a surface-effect vehicle, the element comprising flexible sheet material and a bead at at least one edge thereof adapted for attachment to a body of the vehicle,

the bead extending all along said edge and comprising a portion of the sheet material turned around and bonded to a coex-

tensive continuous flexible bead core which is an elongate metal spiral spring element.

4,702,333

STEERING APPARATUS FOR MOTOR VEHICLES

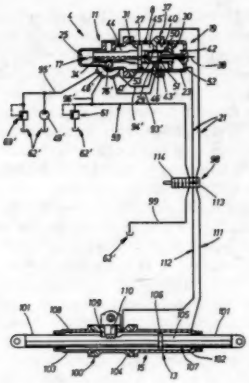
Reinhold Lippert, Kirchheim, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

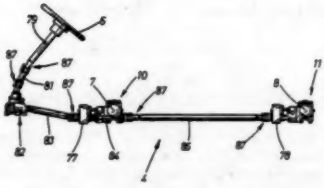
Filed Jul. 23, 1985, Ser. No. 757,945

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1984, 3427160

Int. Cl.[4] B62D *5/06*

U.S. Cl. 180—140 **25 Claims**



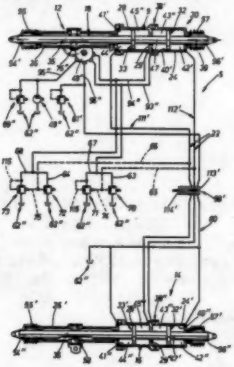


1. A steering apparatus for a motor vehicle, comprising:

steering gear means, connected to a steering control device and to the wheels of a first vehicle axis, for steering the wheels of said first axle;

hydraulic servo means, connected to the steering gear means and to a source of hydraulic pressure, for assisting said gear means in steering the wheels of the first axle;

selectable auxiliary steering means, connected to the wheels of a second vehicle axle, for steering the wheels of said second axle when auxiliary steering is selected, and means for locking the wheels in position for straight ahead travel when auxiliary steering is not selected; and



hydraulic pressure transmitting means, hydraulically interconnecting a gear output of said steering gear means to the auxiliary steering means, for transmitting hydraulic pressure to the auxiliary steering means, when auxiliary steering is selected, in correspondence with movements of the gear output of the steering gear means, and wherein the auxiliary steering means is hydrostatically connected to the steering gear means by the hydraulic pressure transmitting means.

4,702,334

CONTROL DEVICE FOR POWER STEERING APPARATUS

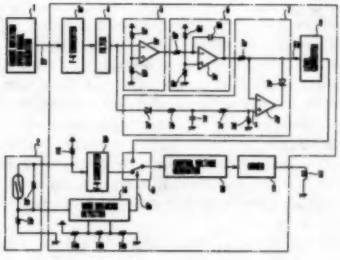
Sadao Takeshima, and Hideo Yabe, both of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Oct. 23, 1986, Ser. No. 922,539

Claims priority, application Japan, Nov. 8, 1985, 60-249059

Int. Cl.[4] B62D *5/06*

U.S. Cl. 180—142 **8 Claims**



1. A control device for a power steering apparatus of which steering force is controlled in accordance with a control signal comprising:

means for producing a signal corresponding to a vehicle speed;

means for producing a signal corresponding to an engine rotation speed;

change relaxation means for relaxing changes in said engine rotation speed signal; and

a switching means for delivering said vehicle speed signal when said vehicle speed signal is available and an output

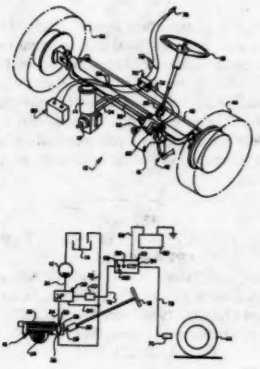
signal of said change relaxation means when said vehicle speed signal is lost, as said steering force control signal, respectively.

4,702,335

CONTROL APPARATUS FOR A POWER ASSIST STEERING SYSTEM

Jerry L. Cage, Granger, and Jonathan B. Kulp, West Lafayette, both of Ind., assignors to TRW Inc., Lyndhurst, Ohio

Filed May 28, 1985, Ser. No. 738,601
Int. Cl.[4] B62D 5/06
U.S. Cl. 180—142 9 Claims



1. An apparatus for controlling power assist in a vehicle power steering system, said apparatus comprising;

an electrically actuatable flow control valve in fluid communiation with a source of pressurized fluid, a directional control valve, and a reservoir, said flow control valve directing a first amount of fluid from the source to the directional control valve and bypassing a second amount of fluid from the source to the reservoir, the first amount and second amount of fluid being varied inversely relative to each other responsive to a control signal;

speed sensing means for generating a signal indicative of the vehicle speed;

manually settable selection means for selecting and setting one of a plurality of power assist control options; and

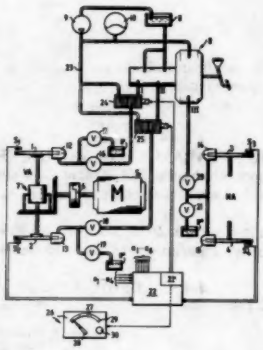
means responsive to the signal from said speed sensing means and to the setting of said selection means for controlling said flow control valve, said power assist available being (i) at a first amount when sensed vehicle speed is below a first value, (ii) at a second amount when sensed vehicle speed is above second value, and (iii) between said first amount and said second amount when sensed vehicle speed is between said first value and said second value, said first and second amounts of power assist available and said first and second values of vehicle speed determined in response to the setting of said selection means.

4,702,336

METHOD AND BRAKE SYSTEM FOR TRACTION CONTROL

Wolfram Seibert, Pfungstadt, and Klaus-Dieter Blum, Kelkheim, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 1, 1986, Ser. No. 892,334
Claims priority, application Fed. Rep. of Germany, Aug. 1, 1985, 3527532
Int. Cl.[4] B06T 26/16, 8/60
U.S. Cl. 180—197 15 Claims



1. A method for traction control for use in automotive vehicles wherein wheel rotation is continuously monitored, with the wheel slip being determined by comparing the rotation of the driven wheels with the rotation of the non-driven wheels and/or a reference quantity such as the vehicle reference speed, and wherein the driving slip is controlled by a braking action on the wheel tending to spin up, said method comprising the steps of: determining the accelerator desired value and/or the deviation therefrom by a logical combination of the signals reflecting the wheel rotation and derived measured quantities; compensating for the driving slip control already initiated; and, signaling the accelerator values to the vehicle operator.

10. A brake system with traction control with sensors to monitor wheel rotation, with electronic circuits for logically combining and processing the sensor signals and for generating brake pressure control signals by means of which brake pressure can be metered into the wheel brake of the wheel tending to spin up, wherein said system is equipped with circuits (22') and indicating instruments (26, 31) which determine the accelerator desired value and/or the instantaneous deviation therefrom during a driving slip control phase and including means for signaling the determined accelerator values to the vehicle operator.

4,702,337

CONTROL SYSTEM FOR AN AUTOMATIC ALL WHEEL DRIVE VEHICLE

Manfred Burckhardt, Waiblingen, and Richard Zimmer, Fellbach, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 10, 1986, Ser. No. 917,610
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1985, 3536185
Int. Cl.[4] B60R 17/34
U.S. Cl. 180—197 17 Claims

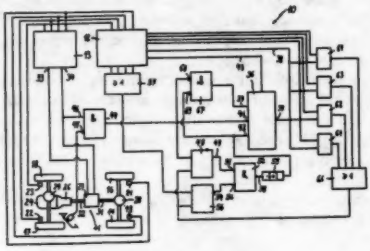
1. A process for generating a reference signal representing the speed of a vehicle, said vehicle having selectable automatic on- and off all wheel drive with wheel sensors, each of which delivers wheel speed signals in proportion to the speed, with an

antilocking control system; having a first electronic control unit that evaluates the wheel speed signals and delivers control signals for decreasing, keeping constant or increasing brake pressure, with an all wheel drive control apparatus; having a second electronic control unit that evaluates the wheel speed signals and:

(1) switches to two axle drive if at least one of the wheels of a permanently driven axle spins,

(2) in the case of continuous spinning of at least one wheel of the two axles, locks a longitudinal differential in the power train between front and rear axles;

the reference signal of the vehicle speed being generated from the wheel speed signals of non-driven wheels, provided only one axle is driven and the reference signal is routed to both control units; said process including:



(a) increasing the reference signal of the vehicle speed at a rate of change, limited by a predetermined acceleration threshold value of approximately 4 m/s^2, if both axles are drive-coupled via the longitudinal differential and the wheel speed signals change with a value that exceeds said threshold value;

(b) restricting the reference signal of the vehicle speed to a maximum value present during the locking of the longitudinal differential;

(c) increasing the reference signal at a rate of change of 4 m/s^2 if a test cycle, which periodically uncouples an axle from the power train, yields that the largest wheel speed signal is higher than the reference signal; and

(d) reducing the reference signal at a high rate of change down to the largest wheel speed signal if the reference signal, generated according to steps (a) to (c), is greater than the largest wheel speed signal.

4,702,338

SUSPENSION DEVICE FOR A VEHICLE WHEEL SUPPORT ARM AND FRONT-REAR COUPLING SYSTEM FOR SAID SUSPENSION

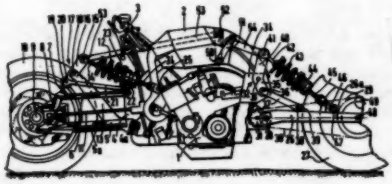
Daniel Trema, Bezons, France, assignor to Elf France, Courbevoie, France

Filed Jun. 16, 1986, Ser. No. 874,576

Claims priority, application France, Jun. 28, 1985, 85 09886

Int. Cl.[4] B62K *25/16*; B60G *21/04*

U.S. Cl. 180—219 **9 Claims**



1. A suspension device for use with a main support arm of a wheel of a motorcycle said main support arm being connected for reciprocated pivotal displacement about a connecting axis integral with a chassis of the motorcycle for cooperation with a suspension compression spring, said device comprising:

a lever having a long arm with a free end,

a short arm and first, second and central pivoting points;

a reaction rod having a first end connected to the short arm and a second, opposite end pivotally connected effectively to a fixed point on the chassis;

the free end of the long arm of the lever being pivotally connected to a first abutting end of the compression spring at a pivot point;

the compression spring having a second end pivotally connected to a fixed point on the chassis;

said main support arm including an extension pivotally connected to said lever;

said main support arm being pivotally connected to said central pivoting point of said lever when said suspension device is used as a front suspension of the motorcycle;

said main support arm being pivotally connected to one of said first and second pivoting points, and said lever being pivotally connected to a fixed point on said chassis at said central pivoting point, when said suspension device is used as a rear suspension of the motorcycle;

whereby said lever causes a reversal in the direction of movement of the reaction rod with respect to said said central pivoting point and amplifies said movement at the pivot point where the compression spring is pivotally connected to the long arm of the lever.

4,702,339

REAR WHEEL BRAKING APPARATUS FOR MOTORCYCLE

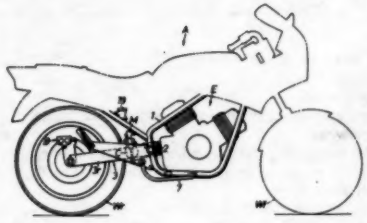
Tsutomu Hayashi, Tokyo; Takeshi Kawaguchi, and Tetsuo Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

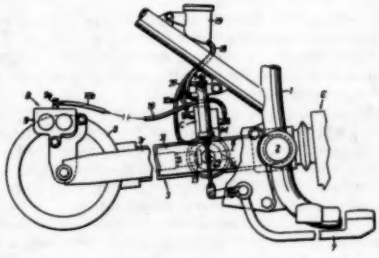
Filed Jun. 25, 1985, Ser. No. 748,495

Claims priority, application Japan, Jun. 26, 1984, 59-131752

Int. Cl.[4] B60T *8/093*; B62K *25/26, 25/28*

U.S. Cl. 180—219 **16 Claims**





1. In a motorcyle having a rear wheel pivotally supported on a rear end of a rear fork, said rear fork being coupled to a

vehicle frame via a pivot shaft for vertical swinging motion, a rear wheel drive device for coupling between said rear wheel and an output shaft of an engine mounted on said vehicle frame being disposed side by side with said rear fork and being operable to indicate a rotational speed of said rear wheel,

a rear wheel braking apparatus which comprises: a master cylinder installed on said vehicle frame; a rear wheel brake operable by an output hydraulic pressure of said master cylinder to apply a braking force to said rear wheel; and an anti-lock controlling unit incorporated with an inertia-type wheel angular deceleration sensor operatively conected with said rear wheel, said unit controlling a hydraulic pressure to be inputted to said rear wheel brake in response to an output from the sensor, wherein said anti-lock controlling unit is installed on said rear fork in close proximity to said pivot shaft, wherein a drive shaft of said sensor is coupled with said rear wheel drive device and wherein said master cylinder is disposed in a vicinity of said anti-lock controlling unit and hydraulically coupled therewith.

4,702,340

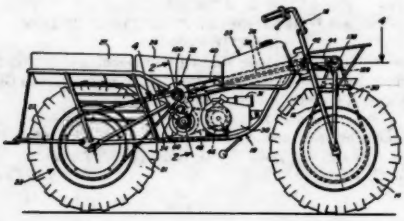
MOTORCYCLE APPARATUS

Mark Hamilton, Keene, N.H., assignor to Rokon International, Inc., Jaffrey, N.H.

Continuation of Ser. No. 774,059, Sep. 9, 1985, abandoned, which is a continuation of Ser. No. 552,744, Nov. 17, 1983, abandoned. This application Jun. 17, 1986, Ser. No. 875,332

Int. Cl.[4] B62M *7/02*

U.S. Cl. 180—224 **2 Claims**



1. A motorcycle comprising;

a frame,

a front wheel,

means supporting the front wheel from the frame,

a rear wheel,

means supporting the rear wheel from the frame,

a vehicle engine supported in the frame and having an output drive shaft,

a torque converter mounted from said engine drive shaft,

a transmission having an input shaft, an output shaft and a gear selector,

means coupling the output of the torque converter to the input shaft of the transmission,

said transmission having multiple engageable gears controlled by said gear selector,

said gear selector having shift means moveable to separate alternate position for providing different gear ratio drive at the transmission output shaft,

means coupled from said transmission output shaft to the rear wheel for providing direct drive to the rear wheel,

means coupled from said transmission output shaft to the front wheel for enabling drive to the front wheel,

said means for enabling drive to the front wheel comprising a drive shaft and a one-way clutch means,

said one-way clutch means comprises a pair of members secured to the drive shaft and transmission output shaft, respectively, a clutch spring disposed about the member and means for interlocking the members enabling rotation therebetween,

said means coupling the output of the torque converter to the input shaft of the transmission comprises a pulley means and a belt intercoupling a pulley associated with the torque converter and a pulley associated with the transmission,

said input shaft supports a first set of gears and further including a gear selector shaft for supporting a second set of gears,

said gear selector shaft has a passage for receiving an operating shaft having the gear selector at one end thereof and having the shift means at the other end thereof,

said operating shaft has a series of detents adapted to register the gear selector at different positions relative to the gear selector shaft,

said gear selector is engageable with only one gear associated with the gear selector shaft at the time,

gears associated with said gear selector shaft have slot means for receiving said gear selector,

said transmission output shaft as direct sprocket chain-drive to the front wheel,

said one-way clutch means comprises a one-way clutch including a pair of members one secured to the drive shaft and the other to the transmission output shaft, a clutch spring disposed about said members and a shoulder pin means for interlocking the members but enabling rotation therebetween, and

means securing one member of the one-way clutch to the transmission output shaft.

4,702,341

FOUR WHEEL DRIVE VEHICLE SLIPPAGE CONTROL DEVICE AND METHOD LIMITING CENTER DIFFERENTIAL ACTION ACCORDING TO INPUT TORQUE SUPPLIED THERETO

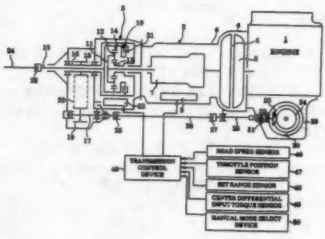
Yutaka Taga; Seitoku Kubo; Yuji Kashihara; Kunio Morisawa; Mitsuru Takada, and Yasunari Nakamura, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Dec. 11, 1986, Ser. No. 940,751

Claims priority, application Japan, Dec. 13, 1985, 60-280662; Mar. 19, 1986, 61-061801; Mar. 19, 1986, 61-061802; Mar. 24, 1986, 61-065314; Apr. 18, 1986, 61-089347; May 6, 1986, 61-105468; May 8, 1986, 61-105542; May 30, 1986, 61-125197; Jun. 24, 1986, 61-149079; Jul. 9, 1986, 61-161298

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—249 **48 Claims**



1. For a four wheel drive power transmission system for a vehicle with two front wheels, two rear wheels, a transmission mechanism, and an engine, comprising a power distribution device for four wheel drive which receives rotational power from said engine via said transmission mechanism and which provides said rotational power to the combination of the front wheels of said vehicle and also to the combination of the rear wheels of said vehicle, said power distribution device for four wheel drive comprising a means for providing differential action between said combination of said front wheels of said vehicle and said combination of said rear wheels of said vehi-

cle, and a means for selectively inhibiting its said differential action by providing torque transmission capacity:

a slippage control device, comprising:

(a) a means for estimating the torque being input to said power distribution device for four wheel drive from said transmission mechanism; and:

(b) a means for controlling the torque transmission capacity of said differential action inhibition means of said power distribution device for four wheel drive according to the thus estimated value of said torque being input to said power distribution device for four wheel drive from said transmission mechanism.

4,702,342

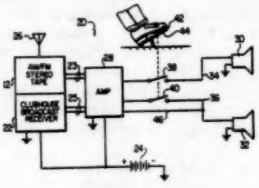
GOLF CART ENTERTAINMENT SYSTEM

Judy Hale, 1500 Diamond Shamrock Tower, Dallas, Tex. 75201

Filed Jan. 3, 1986, Ser. No. 815,897

Int. Cl.[4] H05K *11/02*

U.S. Cl. 180—333 **12 Claims**



1. In combination with a golf cart having a foot pedal for activating and deactivating the golf cart, an entertainment system comprising:

an entertainment source mounted in the golf cart for providing a signal;

an amplifier mounted in the golf cart connected to the entertainment source to receive the signal therefrom;

at least one speaker;

a switched connection means between said amplifier and said at least one speaker for providing the amplified signal to the speaker; and

on/off switch means for connecting said switched connection means in response to activating the golf cart by pressing on said foot pedal, to thereby supply the amplified signal to the at least one speaker, and for disconnecting said switched connection means in response to deactivating the golf cart by releasing said foot pedal, to thereby stop said amplified signal from being supplied to the at least one speaker.

4,702,343

NONDESTRUCTIVE DOWNHOLE SEISMIC VIBRATOR SOURCE AND PROCESSES OF UTILIZING THE VIBRATOR TO OBTAIN INFORMATION ABOUT GEOLOGIC FORMATIONS

Björn N. P. Paulsson, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 18, 1986, Ser. No. 841,074

Int. Cl.[4] G01V *1/40*

U.S. Cl. 181—106 **29 Claims**

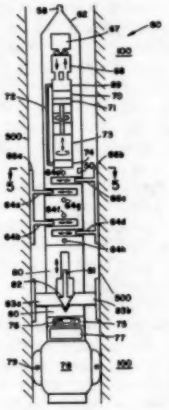
1. A downhole seismic source comprising:

a housing;

a reaction mass attached to and in said housing;

means for clamping the housing at a predetermined fixed position within a wellbore; and

means for hydraulically moving said reaction mass to generate at least one detectable seismic wave of predetermined frequencies attached to said housing such that forces are



reacted from the reaction mass through the housing and the means for clamping into the wellbore.

4,702,344

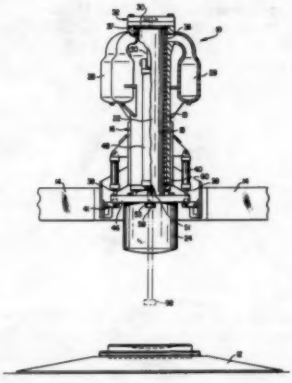
VENT MEANS FOR CLOSED AIR SYSTEM IMPACT-TYPE SEISMIC SOURCE

Tom P. Airhart, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 20, 1986, Ser. No. 841,637

Int. Cl.[4] G01V *1/147*

U.S. Cl. 181—121 **3 Claims**



1. Apparatus for impacting a target comprising:

(a) a hollow upstanding cylindrical housing having a closed upper end and open lower end and provided with a longitudinal bore, the housing being penetrated by a first and a second air passage opening into the bore and respectively penetrating a side wall of the housing and the closed end thereof;

(b) a pressurized air supply vessel communicating with the bore through the first air passage, said second air passage being adapted to provide an escape path to atmosphere for the air in the bore;

(c) piston means slidably interfitted with the bore for movement therein;

(d) valve means for regulating air flow through the second air passage, such valve means being disposed within the housing so as to project within the bore and being biased so as to block such second air passage;

(e) means for supporting the piston means in an upper most position in which piston means projects above and blocks the first air passage so as to isolate the air supply vessel from the bore and so as to engage the valve means in a manner to maintain the second air passage in an unblocked condition;

(f) means for releasing the piston means such that the resultant gravity-induced movement thereof is accompanied in sequence by disengagement with the valve means and unblocking of the first air passage, thereby allowing pressurized air to enter the bore above the piston means and drive the piston means through the open lower end of the housing against the target; and

(g) means for returning the piston means to such upper most position, the upward movement thereof being adapted to repressurize the air supply vessel through the first air passage and thereafter to expel through the second air passage the air confined in the bore between the piston means and the upper end of the housing.

4,702,345

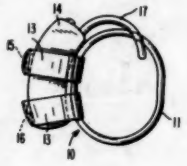
HEARING AID RETENTION DEVICE

Gwen V. Janssen, and Roy C. Rowland, both of 2610 NW. Expressway, Oklahoma City, Okla. 73112

Filed Jul. 21, 1986, Ser. No. 887,874

Int. Cl.[4] H04R *25/00*

U.S. Cl. 181—129 **1 Claim**



1. In a normally ear auricle supported hearing aid of the type having an elongated housing arcuately curved longitudinally and adapted to be supported generally longitudinally upright in a space between the auricle and head of a user adjacent a rearward upper limit of a juncture of the ear auricle with the head by an elongated member extending, in inverted generally J-shaped hook fashion across a forward limit of the ear auricle juncture with the head, between an upper limit of the housing and a hearing aid ear mold disposed in an opening of the ear, the improvement comprising:

an endless flexible ring adapted to snugly surround the ear auricle at its juncture with the head with an arc of the ring circumference juxtaposed with said housing; and,

at least one endless flexible band, having a width substantially greater than its thickness, transversely tightly surrounding an intermediate portion of the juxtaposition of said endless ring and said housing.

4,702,346

VIBRATION INSULATOR

Takaaki Uno, Kawasaki; Takuya Dan, and Michihiro Orikawa, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd. and Bridgestone Corporation, both of, Japan

Filed May 22, 1986, Ser. No. 865,970

Claims priority, application Japan, May 27, 1985, 60-112155

Int. Cl.[4] F16F *1/36*

U.S. Cl. 181—207 **12 Claims**

1. A vibration insulator comprising:

a rigid inner tubular member having an outer circumference;

a rigid outer tubular member having an inner circumference;

an elastomeric body disposed between, and secured to, the outer circumference of said inner tubular member and the inner circumference of said outer tubular member, said elastomeric body being formed with recesses therein;

means including said recesses defining at least first and second closed fluid chambers which hold a working fluid; and

fluid passage defining means providing a curved channel having rigid walls and extending circumferentially about the full inner circumference of said outer tubular member to connect said chambers and provide fluid communication therebetween, whereby vibrations producing relative motion between said inner and outer tubular members distorts said elastomeric body and causes working fluid to flow between said fluid chambers through said channel, which has an effective length to dampen the vibrating flow of working fluid through said channel.

4,702,347

FOLDING, BURGLAR PROOF FIRE ESCAPE LADDER WITH SEPARATE RELEASE STATIONS AND SAFETY BELTS WITH LOCKING BRACKETS

Arild Nilsen, Geithusvn., 3370 Vikersund, Norway

Filed May 28, 1986, Ser. No. 867,679

Claims priority, application Norway, Jul. 12, 1985, 852805; Jan. 28, 1986, 860294

Int. Cl.[4] E06C *9/12, 1/383*

U.S. Cl. 182—8 **9 Claims**

1. An escape ladder which can be mounted in a non-useable condition on the side of a building and which can be placed into a useable condition from any one of a plurality of escape stations in the building located alongside said ladder, said ladder comprising:

an inner rail extending in a longitudinal direction and adapted to be fixedly secured to the side of a building, said inner rail having a length sufficient to extend between at least two vertically spaced-apart escape stations in the building;

a plurality of rungs, each of which is pivotally connected at one end thereof to said inner rail;

an outer rail extending in said longitudinal direction and parallel to said inner rail, each of said rungs being pivotally connected at the outer end thereof to said outer rail, said outer rail being divided into at least two sections which are movable towards and away from said inner rail to allow use of said ladder when at least one of said sections is moved away from said inner rail; and

release bracket means associated with said outer rail for detachably connecting said at least two sections together,

said release bracket means when actuated being operable to detach said at least two sections such that a lower one of said two sections moves away from said inner rail,

whereby said ladder can be used by a person at an escape station positioned adjacent said release bracket means when said person actuates said release bracket means.

4,702,348

SKY-RIDE VERTICAL MOBILITY SYSTEM

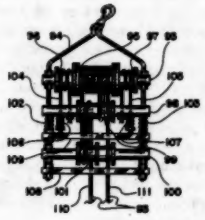
Hyok S. Lew; Hyon S. Lew, and Yon K. Lew, all of 7890 Oak St., Arvada, Colo. 80005

Continuation-in-part of Ser. No. 682,673, Dec. 17, 1984, Pat. No. 4,598,792, and a continuation-in-part of Ser. No. 676,400, Nov. 29, 1984, Pat. No. 4,598,793. This application Mar. 13, 1985, Ser. No. 711,318

The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.

Int. Cl.[4] A62B *1/08*

U.S. Cl. 182—42 **14 Claims**



1. A vertical mobility device for transporting a person between a higher elevation and a lower elevation comprising in combination:

(a) a frictionally controlled cord release device including; a first cylindrical member rotatably and nonshiftably secured to a supporting structure including a means for securing said supporting structure to an elevated structure; a second cylindrical member rotatably and nonshiftably secured to said supporting structure; and a third cylindrical member rotatably and shiftably secured to said supporting structure intermediate said first and second cylindrical members in a substantially parallel relationship with respect to said first and second cylindrical members;

(b) a cord member wound on said first cylindrical member over at least one and one half laps, wherein one portion of said cord member extending from one side of the cylindrical surface of said first cylindrical member loops over the combination of said second and third cylindrical members over at least one complete loop, and the other portion of said cord member extending from the other side of the cylindrical surface of said first cylindrical member loops over the combination of said third and first cylindrical members over at least one complete loop;

(c) at least one brake cord wound on at least one extremity of said first cylindrical member over at least one half lap wherein both extremities of said brake cord are secured to a member shifting with said third cylindrical member; wherein said brake cord produces a brake force hindering rotating movement of said first cylindrical member when tension on said one portion of said cord member is greater than tension on said the other portion of said cord member;

(d) cord guide means for guiding said cord member wound on said first cylindrical member;

(e) at least one securing means affixed to said one portion of said cord member depending from said frictionally controlled cord release device for securing a person to said one portion of said cord member;

(f) at least one stirrup means slidably secured to said the other portion of said cord member depending from said frictionally controlled cord release device, said stirrup means including a pressure activated grip means wherein said grip means grabs said cord member in a nonslidable relationship when said stirrup means is stepped on, while said stirrup means slides substantially freely when said stirrup means does not support a weight;

whereby a person secured to said one portion of said cord member can remain suspended in midair or lower oneself at a safe speed by exerting a small amount of tension on said the other portion of said cord member as said braking force plus said small amount of tension on said the other portion of said cord member substantially counter balances tension on said one portion of said cord member created by weight of said person and said person can elevate oneself by standing up on said stirrup means and then pulling up stirrup means by bending knees while maintaining a small amount of tension on said the other portion of said cord member.

4,702,349

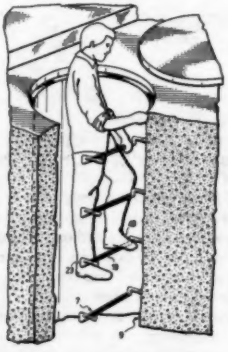
ANCHOR STEP

Heinrich Zenhausern, Birmensdorferstrasse 134A, CH-8902 Urdorf/Zurich, Switzerland

Continuation-in-part of Ser. No. 778,239, Sep. 20, 1985, Pat. No. 4,660,681. This application Dec. 15, 1986, Ser. No. 941,801

Int. Cl.[4] E06C *9/04, 7/08*

U.S. Cl. 182—90 **10 Claims**



1. A U-shaped climbing rung to be anchored in a bore hole in a wall, the climbing rung comprising two parallel legs each leg having two ends, one end of each leg being connected to a

transverse central element or tread spaced a predetermined distance below the parallel legs and having the other end for anchoring in a wall, the legs and tread being completely encapsulated in a synthetic protective coat having an outer configuration adapted to present each end of the legs remote the tread for anchoring the climbing rung in the wall, each encapsulated end having means for anchoring the end of each leg in a wall, each encapsulated end behind said anchoring means receiving a soft elastic tightly fitting and slidable sealing collar, each sealing collar being mounted so as to frictionally slide along each leg to present a sealing face to an abutting wall deforming when abutting the surface of the wall to accommodate the surface configuration of the wall surrounding each bore hole, at least one surface of either (i) each encapsulated end behind said anchoring means or, (ii) the inside surface of each sealing collar, comprising alternating raised rings and annular grooves, whereby the combination of the means for securely anchoring the end of each leg in a wall, the sealing collar presenting a sealing face to an abutting wall, and the alternating raised rings and annular grooves sealing the interface between each encapsulated end and the inside surface of each sealing collar thereby precludes water and corrosive material from penetrating the bore hole.

4,702,350

SPRING DRIVE DEVICE

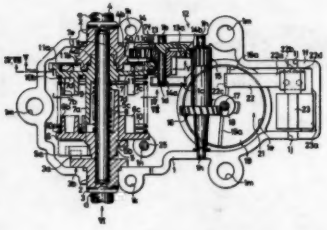
Makoto Orii, and Katsuhiko Hayashi, both of Nagano, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed Jun. 4, 1986, Ser. No. 870,604

Claims priority, application Japan, Jun. 5, 1985, 60-122160

Int. Cl.[4] F03G *1/00*

U.S. Cl. 185—39 **9 Claims**



1. A spring device comprising:

a motive spring including a coil spring;

winding means for winding said motive spring;

a rotary shaft;

a spring holder to which one end of said coil spring is secured said spring holder being mounted on said shaft;

an output gear which is mounted on said shaft, and to which the other end of said coil spring is secured so that said output gear is turned by said coil spring;

a rotor mounted on said shaft;

means for coupling said rotor to said output gear in the direction of rotation;

regulating means for limiting the angle of rotation of said rotor; and

a case enclosing said spring holder, output gear and rotor, said spring holder having a part engaged with said case.

4,702,351

SELF-ENERGIZING DISC BRAKES

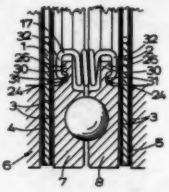
Anthony G. Price, Gwent, Wales, and Roy Campbell, Worcestershire, England, assignors to Lucas Industries Public Limited Co., Birmingham, England

Filed Apr. 2, 1986, Ser. No. 847,284

Claims priority, application United Kingdom, Apr. 2, 1985, 8508543; May 23, 1985, 8513054; Jun. 7, 1985, 8514456

Int. Cl.[4] F16D *55/08*; F16F *1/12*; B23P *11/00*; B21B *1/46*

U.S. Cl. 188—71.4 **18 Claims**



11. A pressure plate for a self-energising disc brake of the type comprising a housing, first and second axially spaced braking surfaces in said housing, radial pilot lugs and a drag-taking stop abutment in said housing, first and second pressure plates centred on said pilot lugs, tension return springs acting between said plates, adjacent faces of said pressure plates being provided with co-operating oppositely inclined angularly spaced recesses, rolling bodies located in complementary pairs of said recesses, a rotatable friction member disposed between each said pressure plate and an adjacent said braking surface, each said member comprising a disc, and first and second linings of friction material for engagement with said pressure plate and said braking surface carried by opposite faces of said discs, and means for moving said pressure plates angularly relative to said housing to initiate application of said brake with said pressure plates also moving axially against the force in said tension springs to urge the friction members into engagement with said braking surfaces due to a tendency for said rolling bodies to ride up ramps defined by said end faces and constituting camming means, said plates being carried round with said discs until one of said plates is arrested by the engagement of a lug on that plate with said drag-taking stop abutment, whereafter continued angular movement of the other of said plates provides a servo action, wherein said pressure plate is provided with at least one integrally cast projection which projects outwardly from the inner peripheral edge thereof, and recess dimple is also cast integrally in said projection in a face of said projection adjacent to said braking face of said pressure plate which is adapted to co-operate with a friction disc in the assembled said brake, a region of the projection radially outwards of the recess dimple defining an abutment face forming an anchorage for an anchorage portion at one end of a tension return spring with said recess dimple accommodating a free end of the said anchorage portion.

4,702,352

AUTOMATIC ADJUSTER

Brian Ingram, Gloucestershire; Hugh G. Margetts, Herefordshire, and Michael J. England, Gwent, all of Great Britain, assignors to Lucas Industries Public Limited Co., Birmingham, England

Filed Mar. 20, 1986, Ser. No. 841,764

Claims priority, application United Kingdom, Mar. 21, 1985, 8507299

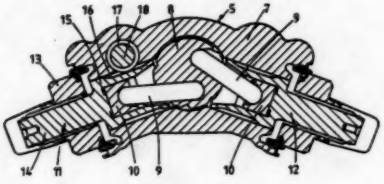
Int. Cl.[4] F16D *51/50*

U.S. Cl. 188—5 GE **15 Claims**

1. An automatic adjuster for a vehicle brake comprising a strut having two parts between which there is a non-reversible screw threaded connection permitting the effective length of the strut to be increased by relative rotation between the parts under the influence of an adjuster device which incorporates

clutch means for controlling said relative rotation in response to the occurence of excessive clearance between braking surfaces of the brake, one of the adjuster parts being coupled by a two-part uni-directional means to a relatively fixed part of the adjuster and means urging the respective parts of the uni-directional means towards mutual engagement, for resisting rotation of said one adjuster part in a de-adjusting direction and permitting rotation thereof in the adjusting direction.

8. An automatic adjuster for a vehicle brake comprising a strut having two parts between which there is a non-reversible screw threaded connection permitting the effective length of the strut to be increased by relative rotation between the parts under the influence of an adjuster device which incorporates clutch means for controlling said relative rotation in response to the occurence of excessive clearance between braking surfaces of the brake, one of the adjuster parts being coupled by



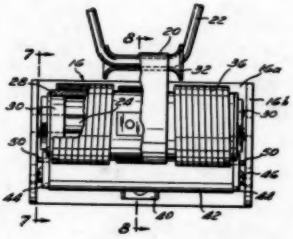
uni-directional means to a relatively fixed part of the adjuster to resist rotation of said one adjuster part in a de-adjusting direction but to permit rotation thereof in the adjusting direction, wherein said uni-directional means comprises two parts independently movable axially but keyed against relative rotation, one of which parts is non-rotatably engaged with said one adjuster part and the other of which is releasably uni-directionally coupled to said relatively fixed part and wherein a manual adjuster spindle is movable from an inoperative position to an operative position in which it drivingly engages said one adjuster part, said other part of the uni-directional means being engagable by part of the spindle, as the latter is moved towards its operative position. so that during such movement, the spindle urges said other part to a released position in which said coupling is disengaged to permit rotation of said one adjuster part by said spindle.

4,702,353

ACCELERATION LIMITER

Elmer C. Yang, Orange, Calif., assignor to Pacific Scientific Company, Anaheim, Calif.

Filed Sep. 10, 1985, Ser. No. 774,287
Int. Cl.[4] F16F 9/00
U.S. Cl. 188—135 **25 Claims**



1. Apparatus for limiting the acceleration applied to a body comprising:

brake means to be connected to said body; and

means for connecting the brake means to a support in a manner to permit limited movement of the body relative to the support;

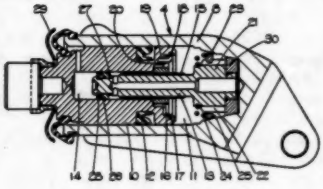
said brake means including means for sensing the acceleration of said body and means responsive to said acceleration sensing means for preventing movement of the body relative to said support below a predetermined acceleration, while permitting braked movement of the body relative to said support at said predetermined acceleration.

4,702,354

BRAKE ACTUATOR

Brian Ingram, Alyburton; Hugh G. Margetts, Ross-on-Wye, and John R. Rees, Chepstow, all of England, assignors to Lucas Industries, Birmingham, England

Continuation of Ser. No. 694,254, Jan. 24, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 6,341
Claims priority, application United Kingdom, Feb. 2, 1984, 8402775
Int. Cl.[4] F16D 65/56
U.S. Cl. 188—196 D **7 Claims**



1. A single-acting hydraulic actuator for a vehicle brake, comprising:

a cylinder body; said cylinder body having a clutch face;

an actuator piston slidable within said cylinder body;

an automatic adjuster which includes a strut of variable length, said strut including strut members threadedly interengaged by a non-reversible screw thread connection;

one of said strut members being a rotatably supported adjuster shaft; a control means adapted to contact said clutch face for controlling rotation of said adjuster shaft; said adjuster shaft including a reversible screw thread for engagement with a similar thread on said control means to form a reversible screw thread connection;

said actuator piston supporting a nut; said actuator piston having an area upon which hydraulic pressure acts; said nut being one of said strut members and having a threaded portion, said adjuster shaft including a threaded portion in engagement with said nut; said engaged, threaded portions forming said non-reversible screw thread connection; said nut being separate from but non-rotatably coupled to said actuator piston; said actuator piston having a first surface forming a pressure area;

said adjuster shaft extending within a bore in said actuator piston and being sealed against said bore to form a pressure area smaller than said piston area;

a means for applying actuating pressure to said actuator piston and said adjuster shaft areas so as to create a first force on said piston area and a second force on said adjuster shaft area; said forces acting in the same direction, upon brake actuation, to produce a resultant force loading said non-reversible screw thread connection;

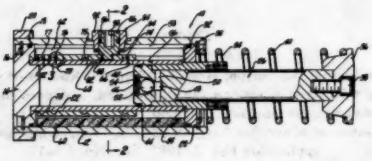
whereby said resultant force generates a force in said non-reversible screw thread connection such as to resist relative rotation of said strut members.

4,702,355

SHOCK ABSORBER WITH HOLE-ON-GROOVE CONFIGURATION AND WITH ADJUSTING DEVICE

Robert J. Heideman, Westland, Mich., assignor to Enertrols, Inc., Westland, Mich.

Filed Jun. 7, 1985, Ser. No. 742,408
Int. Cl.[4] F16F 9/48
U.S. Cl. 188—285 1 Claim



1. A shock absorbing device for absorbing the kinetic energy of a moving member so as to decelerate the member, said device comprising:

(A) a tubular cylinder having a plurality of longitudinally and exponentially spaced circular holes;

(B) a piston slidable within said cylinder and adapted to be contacted by the moving member;

(C) a sleeve slidably surrounding said cylinder and having

(1) a plurality of annular internal grooves of semicircular cross section corresponding in number and longitudinal and exponential spacing to said holes in said cylinder, respectively lying in longitudinal and exponentially spaced parallel planes normal to the axis of the cylinder, and having a uniform cross section throughout their circumferential extent,

(2) a circular hole associated with each groove having a diameter substantially corresponding to the diameter of the grooves, centered with respect to the associated groove, opening at its outer end in the outer surface of said sleeve, and opening at its inner end in the associated groove to coact with that groove and with the associated hole in said cylinder to define a metering passage for hydraulic fluid providing substantially turbulent hydraulic fluid flow therethrough so that said device is largely insensitive to variations in the temperature of the hydraulic fluid occurring over periods of usage, and

(3) a circular adjuster hole; and

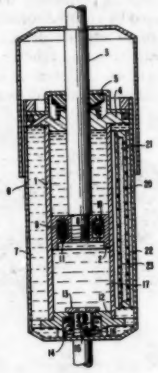
(D) an adjuster member mounted for rotation about an adjuster axis generally normal to the axis of said cylinder and including an eccentric cam portion received in said circular adjuster hole in said cylinder and operative in coaction with said adjuster hole and in response to rotation of said adjuster member about said adjuster axis to create simultaneous relative radial and axial movement between said sleeve and said cylinder so that the grooves in said sleeve move in an orbital pattern relative to the holes in said cylinder to adjust the flow characteristic of the metering passages, rotation of said adjuster member through a series of adjustment positions respectively defining a plurality of positions of relative adjustment between said sleeve grooves and said cylinder holes to selectively provide a plurality of flow characteristics through the metering passages, and said adjuster member being operative to provide the same flow characteristics in more than one of its adjustment positions.

4,702,356

ELASTIC COMPENSATION CHAMBER FOR HYDRAULIC ENERGY DISSIPATOR

Maurice Katz, Paris, and Antoine Renard, Le Creusot, both of France, assignors to Jeumont-Schneider Corporation, Puteaux, France

Filed May 2, 1985, Ser. No. 729,543
Claims priority, application France, May 11, 1984, 84 07264
Int. Cl.[4] F16F 9/08
U.S. Cl. 188—315 14 Claims



1. A hydraulic energy dissipator of the telescopic type comprising, in combination, a working cylinder filled with liquid and separated into two chambers by a piston supported on a shaft for movement within said working cylinder, calibrated valve means carried by said piston for effecting predetermined hydraulic resistance to movement imparted to said piston by said shaft in order to transform mechanical energy applied to said shaft into heat, a liquid-filled exterior tube surrounding said working cylinder and defining therewith an annular volume which surrounds said working cylinder, said annular volume being in communication by way of additional calibrated valve means with said working cylinder, and elastic compensation chamber means within said annular volume including one or more gas-filled cylindrical sections of variable volume which only partially surround said working cylinder, each said cylindrical section having protuberances projecting outward from opposite exterior surfaces thereof into engagement with said working cylinder and said exterior tube and supporting said cylindrical section in a fixed position within said annular volume and such that a major portion of said cylindrical section is held spaced from said working cylinder and said exterior tube, said one or more cylindrical sections leaving large free spaces adjacent thereto between and along said working cylinder and said exterior tube, which spaces permit relatively free circulation of liquid within said annular volume, between and along said working cylinder and said exterior tube, and thereby promote removal of heat from said working cylinder so as to avoid dangerous temperature elevation of said dissipator.

4,702,357

DRUM BRAKE ADJUSTER

Walter J. Rozmus, Port Orange, Fla., assignor to Kelsey Hayes Co., Romulus, Mich.

Filed Aug. 8, 1985, Ser. No. 763,507
Int. Cl.[4] F16D 65/56
U.S. Cl. 188—79.5 GC 6 Claims

1. A servo drum brake assembly comprising:

a drum;

a primary and second brake shoe assembly, each brake shoe assembly including an arcuate table, a friction pad affixed

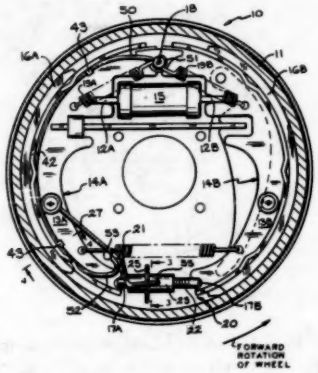
to said arcuate table for frictional engagement of said drum, and a web projecting radially inward from said table;

frame means to which said brake shoe assemblies are affixed and transmit braking torque;

extensible means engaging the primary and secondary shoe assemblies, said extensible means including a star wheel the rotation of which varies the distance between said assemblies;

activation means for urging said brake shoe assemblies into frictional engagement with said drum;

retraction means for returning said brake shoe assemblies to



their non activated position upon deactivation of said activation means;

push rod means in sliding contact with the inside surface of said primary brake shoe arcuate table, said push rod means affixed to said frame means at one end thereof and having pawl means in engagement with said star wheel at its free end;

means for proportionally advancing said pawl means from its at rest position along the periphery of said star wheel in response to circumferential movement of said primary brake shoe assembly upon activation of said brake and returning said pawl means to its at rest position upon deactivation of said brake.

4,702,358

CLUTCH BRAKE STEERING CONTROL

James P. Mueller, East Peoria, and Weldon L. Phelps, Dunlap, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Oct. 10, 1986, Ser. No. 917,761
Int. Cl.[4] F16D *67/04*
U.S. Cl. 192—13 R **11 Claims**

1. In a vehicle having a pair of tracks in which driving force is applied to the tracks thereof, including clutch and brake systems associated respectively with the tracks of each side thereof and responsive to a source of fluid pressure for steering of the vehicle, each clutch and brake system comprising a clutch alternately engageable and disengageable to respectively connect and disconnect the driving force applied to the track of the vehicle, and a brake alternately actuatable and releasable to respectively brake and release the track of the vehicle, a control apparatus for the clutch and brake steering system comprising:

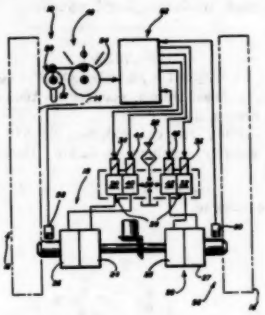
clutch valve means for controlling the fluid pressure delivered to said clutch in response to receiving an electrical control signal;

brake valve means for controlling the fluid pressure delivered to said brake in response to receiving an electrical control signal;

means for determining a desired velocity differential between said tracks;

means for delivering first and second signals correlative to the respective velocities of each of said tracks;

processing means for receiving said first and second track velocity signals, determining the differential therebe-



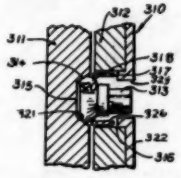
tween, comparing said determined and desired velocity differentials to determine the differential error, delivering a control signal to the clutch valve means of one of the tracks in response to the error being less than a preselected setpoint, and delivering a control signal to both the clutch and brake valve means of said one of the tracks in response to the error being greater than the preselected setpoint.

4,702,359

TORQUE OVERLOAD RELEASE CLUTCH

Jon R. Mancuso; Thomas G. Fromknecht, both of Erie, Pa., and Robert E. White, Conneaut, Ohio, assignors to Zurn Industries, Inc., Erie, Pa.

Filed Feb. 3, 1986, Ser. No. 825,357
Int. Cl.[4] F16D *7/02, 11/06*
U.S. Cl. 192—56 R **26 Claims**



1. A torque overload release clutch comprising:

a first rotary member and a second rotary member,

means supporting said rotary members to rotate about a common axis,

at least one first cam on said first rotary member,

at least one pin slidably supported on said second rotary member,

at least one second cam supported on said second rotary member,

a first follower and a second follower connected together and supported on said pin,

said first follower member comprising a first end of said pin,

said first follower normally engaging said first cam and said second follower normally engaging said second cam,

said first cam being adapted to exert a force on said first follower moving said first follower and said second follower relative toward said second cam whereby said second cam is resiliently distorted by said second follower resisting the movement of said followers toward said second cam,

the shape and material of said second cam providing for elastic deformation of said second cam providing a reaction force whereby said first follower is moved out of engagement with said first cam when the torque exerted by said first rotary members on said second rotary member reaches a predetermined value,

said first follower, said second follower and said second cam being made of thermoplastic material.

4,702,360

VISCOUS FLUID COUPLING

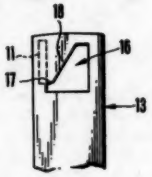
Seiya Tanaka, Bisai, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

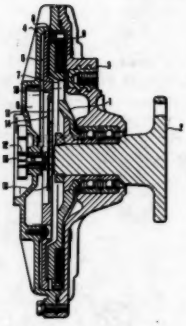
Filed Dec. 18, 1985, Ser. No. 810,258

Claims priority, application Japan, Dec. 20, 1984, 59-192287[U]

Int. Cl.⁴ F16D *35/00, 43/25*

U.S. Cl. 192—58 B **1 Claim**





1. A viscous fluid coupling, comprising:

an input member equipped with a rotor,

an output member equipped with an internal chamber for housing viscous fluid and said rotor,

a partition dividing said internal chamber into a working chamber of said rotor and a reservoir chamber for viscous fluid, said partition having a rectangular-shaped slot forming a passageway for circulating viscous fluid,

a pump mechanism for communicating viscous fluid with pressure from said working chamber to said reservoir chamber,

a valve member for controlling the opening and closing of said slot,

a temperature sensor for sensing ambient temperature and moving said valve member rotatively so that the opening area of said slot becomes large according to increase of temperature, and

said valve member having a through hole for opening and closing said slot according to the rotative movement of the valve member, said through hole having a trapezoidal shape of which one side edge is formed with a two-stepped slope, the first step slope being shorter and gentler as compared to the second step slope, so that the increase rate of said opening area of the slot is smaller in a low temperature region than in a high temperature region.

4,702,361

CLUTCH AND RELEASE BEARING ASSEMBLY

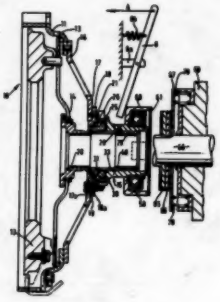
John D. Banks, Leamington Spa, England, assignor to Automotive Products plc, Leamington Spa, England

Filed May 23, 1986, Ser. No. 866,406

Claims priority, application United Kingdom, May 24, 1985, 8513234

Int. Cl.⁴ F16D *19/00*

U.S. Cl. 192—98 **26 Claims**



1. A clutch and release bearing assembly comprising a first member, operatively connected to releasing means of the clutch and having a screw threaded surface, a second member movable axially relative to the first member and being operatively connectable to an operator controlled release member, an element in threaded engagement with the first member and through which clutch release forces are transmitted from the second member to the first member, locking means to prevent said element from rotating relative to the first member during clutch release, abutment means on the clutch for releasing the locking means and element when the second member reaches a predetermined position to allow the element to rotate relative to the first member thereby allowing the first member to move axially relative to the second member, and resilient means for urging the second member axially towards the clutch and which acts between the second member and means on the clutch.

4,702,362

FRICTION CLUTCH FOR A VEHICLE

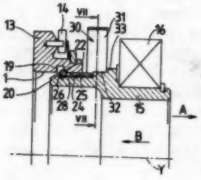
John D. Banks, Whitnash; Robert J. Ball, Bishops Itching, and Denzil J. W. Symonds, Warwick, all of England, assignors to Automotive Products plc, Leamington Spa, England

Filed Jun. 10, 1986, Ser. No. 872,390

Claims priority, application United Kingdom, Jun. 10, 1985, 8514600; May 8, 1986, 8611222

Int. Cl.⁴ F16D *23/14*

U.S. Cl. 192—98 **29 Claims**



1. A friction clutch for a vehicle which includes a clutch

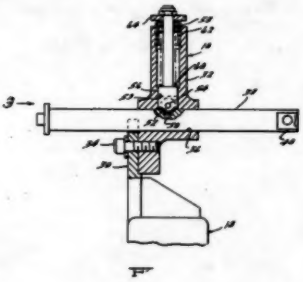
release mechanism comprising a first member, a second member, a detent arranged to locate and retain the first member relative to the second member on assembly by moving the first member in one direction relative to the second member whereby a clutch release force subsequently applied to said first member in an opposite direction will be transmitted to said second member to release the clutch and detent release means which enables the detent to be released by urging said first member further in said one direction relative to said second member so that the first and second members can thereafter be separated by moving said first member in said opposite direction, said detent being carried by one of said members and the detent release means being carried by the other of said members whereby on separation of the members following release of the detent said detent and detent release means disengage and remain on their respective members.

4,702,363

COMBINATION ELECTRIC AND MECHANICAL SERVO DRIVE CLUTCH

Hugh M. Sofy, Bloomfield Hills, Mich., assignor to HMS Products Co., Troy, Mich.

Filed Jul. 31, 1986, Ser. No. 891,166
Int. Cl.[4] F16D *7/00*
U.S. Cl. 192—150 **1 Claim**



1. A clutch for mechanically and electrically disconnecting the servo drive of a reciprocable transfer mechanism, said clutch comprising a clutch housing mounted for movement along a first axis by said electrical servo drive, said housing having a first bore extending at a right angle to the axis or reciprocation thereof, a reciprocable piston in said first bore, a roller journaled on said piston for rotation about an axis extending at a right angle to the reciprocable axis of said piston, a second bore in said housing extending parallel to the axis of reciprocation of said housing, a transfer bar journaled in said second bore, a groove in said transfer bar complementary to said roller for the acceptance thereof, resilient means normally biasing the roller on said piston into the groove on said transfer bar whereby movement of said housing normally effects like movement of said transfer bar, and a normally closed electrical switch on said housing controlled by the piston in said clutch housing, movement of said roller out of the groove in said transfer bar effecting simultaneous mechanical disconnect of said servo drive from said transfer mechanism and opening of said switch to effect electrical disconnect of said servo drive.

4,702,364

SILO CHUTE HOPPER ATTACHMENT

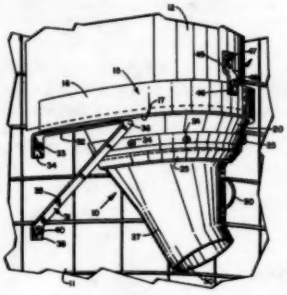
Richard G. Johanneck, Rt. 1, Box 13, Litchfield, Minn. 55355

Filed May 9, 1986, Ser. No. 861,513
Int. Cl.[4] B65G *11/20*
U.S. Cl. 193—22 **9 Claims**

1. A hopper arrangement for a silo having an upright silo chute with a bottom edge, and a discharge opening including:

a pair of brackets adapted to be mounted onto a silo and laterally spaced apart below the bottom edge of the silo chute, said brackets having laterally extending support portions immediately below the silo chute; and

a silo hopper having laterally extending flange means on opposite sides thereof for being supported on said support portions of the brackets immediately below a silo chute,



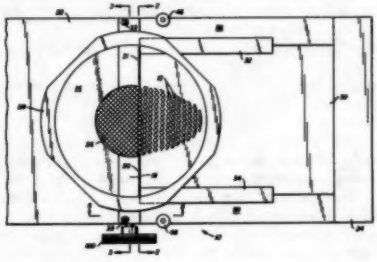
said hopper having a hopper opening and a hopper outlet through which sileage can be discharged and said support portions and flange means cooperating for permitting substantially horizontal slidable movement of the silo hopper to a position to uncover the discharge opening of the silo chute.

4,702,365

APPARATUS FOR REMOVING INDIVIDUAL WAFER SEGMENTS FROM A FRAMED CARRIER

Chong-Il Pak, 3610 Bassett St., #5, Santa Clara, Calif. 95050

Continuation-in-part of Ser. No. 649,080, Sep. 10, 1984, Pat. No. 4,607,744. This application Aug. 13, 1986, Ser. No. 896,655
Int. Cl.[4] B65G *47/31*
U.S. Cl. 198—461 **17 Claims**



11. An apparatus for separating the segments of a divided wafer comprising,

base means,

a flat support surface mounted atop a portion of said base means, said support surface having a first end and a second end,

a separator plate mounted atop said base means adjacent said second end of the support surface,

conveyor means attached to said base means, said conveyor means having a rotatable endless belt, said endless belt providing a flat transport surface having a first and a second edge, said first edge spaced apart from said separator plate to form a narrow gap, said separator plate and said support surface disposed at a descending angle relative to said transport surface,

a flexible carrier, said divided wafer adhesively secured to said flexible carrier,

frame means for framing said wafer adhering to said carrier,

take-up means rotatably mounted within said base means, said take-up means being adapted to grip said carrier, and drive means coupled to said conveyor means and said take-up means, said drive means simultaneously rotating said take-up means at a first velocity and moving said transport surface in a direction from said first edge to said second edge at a second velocity greater than said first velocity, said rotation of the take-up means exerting a force on said carrier to pull the carrier through said narrow gap.

4,702,366

BUCKET CONVEYOR WITH A ROTATABLE BOOM

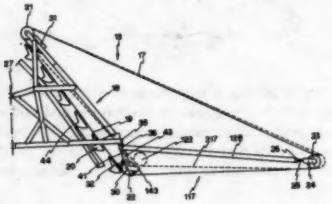
Luigi Zaccaron, Strada dei Colli, 2, 33030 Moruzzo (UD), Italy

Filed Jan. 22, 1985, Ser. No. 693,194

Claims priority, application Italy, Jan. 23, 1984, 83308 A/84; Feb. 20, 1984, 83321 A/84

Int. Cl.[4] B65G *17/36*

U.S. Cl. 198—509 **13 Claims**



1. A bucket conveyor comprising:

a boom rotatable in a horizontal plane, comprising:

a generally vertical front frame member comprising a lower section which is rotatable in a vertical plane;

a lower bar having first and second ends, the first end being pivotably secured to the lower section of said frame member, said bar being rotatable in a vertical plane;

a front lower pulley located in the vicinity of the first end of the lower bar; and

a rear lower pulley in the vicinity of the second end of the bar;

an endless catenary of buckets comprising a plurality of buckets carried on at least one chain; and

means for tensioning said catenary;

said front and rear lower pulleys defining a tensioned, generally horizontal run for said catenary, said buckets being carried on the horizontal run in loaded condition from said rear lower pulley to said front lower pulley above the surface on which the conveyor rests;

tension being maintained as said catenary lengthens during use through downward rotation of said lower bar, the tension in said catenary holding said lower bar in a generally horizontal position.

4,702,367

LOADING DEVICE FOR A BELT CONVEYOR

Kennet Svensson, Örkelljunga, Sweden, assignor to AB Siwertell, Bjuv, Sweden

Filed Sep. 24, 1985, Ser. No. 779,573

Claims priority, application Sweden, Sep. 25, 1984, 8404805

Int. Cl.[4] B65G *47/58*

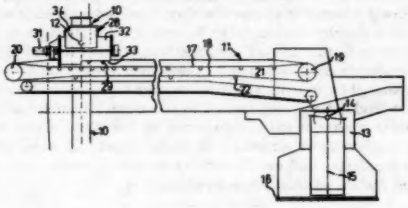
U.S. Cl. 198—550.9 **6 Claims**

1. A loading device for a belt conveyor for transferring bulk material from a feed device, especially a screw conveyor, to a belt conveyor comprising

a belt conveyor;

a rotary feed screw positioned substantially parallel to said belt conveyor and having peripheral edges of said rotary feed screw positioned adjacent and in close proximity to an upper surface of said belt conveyor to effect the movement of the bulk material onto and while on said belt conveyor in the travelling direction of said belt conveyor;

a feed screw casing having a circumferential surface and containing said rotary feed screw;



said feed screw casing having a discharge opening extending along at least a portion of said circumferential surface of said feed screw casing with said discharge opening facing said belt conveyor.

4,702,368

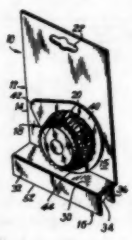
VERTICALLY SELF SUPPORTING DISPLAY PACKAGE

David A. Jones, Dayton, Ohio, assignor to The Drackett Company, Cincinnati, Ohio

Filed Nov. 24, 1986, Ser. No. 934,045

Int. Cl.[4] B65D *5/52*

U.S. Cl. 206—45.24 **6 Claims**



1. A self-supporting display package having a single vertical panel for receiving on one side thereof a product to be displayed, said product being secured to said panel in order to be at a predetermined height above the surface supporting said package, said package comprising:

a plurality of panels integrally formed with the bottom of said vertical panel, said panels joined to each other and to said vertical panel along respective parallel fold lines and foldable into a substantially open frame adjacent the bottom of said vertical panel, said frame extending to said one side of said vertical panel below said product; and

a locking tab foldably joined to each end of one of said plurality of panels, said locking tab being foldable about a substantially horizontal fold line into a vertical orientation within said frame to retain the shape thereof.

4,702,369

STORAGE CONTAINER FOR RECORDS OR THE LIKE

Isidore Philosophe, Brookline, Mass., assignor to Ciaram Ltd./Ltee., Scarborough, Canada

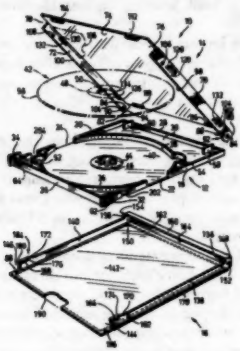
Filed Jan. 31, 1986, Ser. No. 824,508

Int. Cl.[4] B65D *85/57*

U.S. Cl. 206—312 **12 Claims**

1. In a storage unit or the like, a drawer-like receptacle, a pair of opposed separable shell-like members for releasably supporting said drawer-like receptacle therewithin, each said

shell-like member presenting a mating edge formation to the other of said shell-like members, said mating edge formation including a recessed portion therein of a configuration and perimetral extent to define an access opening therebetween for passing said drawer-like receptacle therethrough, guide means carried by at least one of said shell-like members and extending inwardly of said access opening for guiding said receptacle



under displacement through said access opening and into substantially full registration within said opposed pair of shell-like members to define an enclosed unit with said receptacle and for permitting the withdrawal of said receptacle to at least an extent as to provide access to the interior thereof, and hinge means on said shell-like members for pivoting said members away from each other to a substantially open position to expose said drawer-like receptacle registered therein.

4,702,370

ELECTRONIC COMPONENTS SERIES

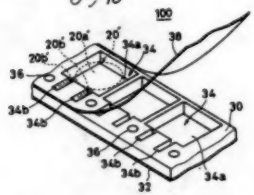
Yukio Honda, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Aug. 16, 1985, Ser. No. 766,264

Claims priority, application Japan, Aug. 21, 1984, 59-173587

Int. Cl.[4] B65D *75/22*

U.S. Cl. 206—331 **4 Claims**



1. An electronic components series comprising:

(a) a number of electronic components, each having a main body and a plurality of leads or terminals protruding in the same given direction from said main body,

(b) a belt-shaped holding body elongated in a longitudinal direction and holding said electronic components,

a number of recesses being formed in said holding body at equal intervals in the longitudinal direction thereof, each said component being held entirely in a respective one of said recesses,

each of said recesses including a main body storing portion holding said main body and a leads or terminals storing portion holding said plurality of leads or terminals and extending in said same given direction from said main body storing portion, said main body storing portion and said leads or terminals storing portion being in communication with each other and having different shapes and holding said main body and said leads or terminals, respectively, and each of said leads or terminals storing portions including a plurality of extension portions for receiving respective ones of said plurality of leads or terminals; and

(c) a sealing tape attached to one main surface of said holding body and sealing said recesses with the main body of said electronic components being stored in said main body storing portions and respective ones of said leads or terminals being stored in corresponding ones of said plurality of extension portions of said leads or terminals storing portions.

4,702,371

CONTAINER FOR ELECTRICAL COMPONENTS

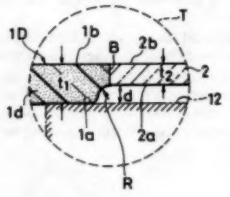
Akio Hoshi, Isesaki, and Toshiyuki Oura, Ohme, both of Japan, assignors to Hitachi, Ltd. and Hitachi Tokyo Electronics Co., Ltd., both of Tokyo, Japan

Filed Jun. 26, 1986, Ser. No. 879,012

Claims priority, application Japan, Jul. 10, 1985, 60-150129

Int. Cl.[4] H05F *3/02, 3/00*

U.S. Cl. 206—328 **14 Claims**



1. A one-piece extruded container for semi-conductor devices having a box-like shape resin encapsulation and a plurality of leads protruding from at least two side surfaces thereof and bending along a bottom surface of the devices, the container comprising an elongated tube formed of a plastic material so that a plurality of semi-conductor devices can be stored therein, said tube comprising a bottom wall, spaced side walls extending upwardly from said bottom wall, and a top wall joined to upper ends of said side walls, said bottom wall and said side walls being formed of an electrically conductive plastic material of a substantially equal thickness, said top wall including a longitudinally extending transparent window of plastic material integrally extruded with said side walls, an upper surface of said transparent window is flush with remaining portions of the top wall formed of the electrically conductive material, and electrically conductive portions sandwiching said transparent window and having a thickness substantially equal to the thickness of said bottom wall and said side walls, the thickness of said transparent window in said top wall being smaller than the thickness of said electrically conductive portions thereof so that a plane including a lower surface of said window and a plane including the lower surfaces of said conductive portions are spaced at a predetermined distance.

4,702,372

STORAGE CONTAINER FOR COMPACT CASSETTES

Peter Ackeret, Kusnacht, Switzerland, assignor to IDN Inventions and Development of Novelties ag, Fed. Rep. of Germany

Continuation of Ser. No. 645,063, Aug. 28, 1984, abandoned. This application Jan. 8, 1986, Ser. No. 817,232

Claims priority, application European Pat. Off., Aug. 29, 1983, 831084736

Int. Cl.[4] B65D *85/672, 85/57*

U.S. Cl. 206—387 **71 Claims**

1. Apparatus for the storage of cassettes containing recording media comprising:

a housing, said housing being open at one narrow side and

having a floor, said housing open side defining a plane which is generally transverse to said floor, said housing including a plurality of internal guide rails which are integral with said floor, said guide rails extending in a direction which is generally transverse to said plane, said guide rails cooperating with said floor to define open-sided guide channels;

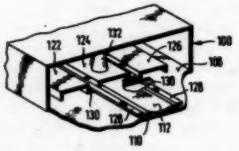
a slider member, said slider member having a front wall, a rear wall and a bottom which extends between said front and rear walls, at least the central part of the bottom of said slider member having an inverted U-shaped profile, said slider member bottom further having plural guide bars which are vertically displaced from and extend generally parallel to the base of said U-shaped portion of said slider member bottom, said guide bars being received in said guide channels and being overlapped by said housing guide rails whereby said slider member is guided for movement relative to said housing;

spring means for biasing said slider member in the direction of said housing open side;

stop means for limiting the motion of said slider member in the direction of said spring means bias;

manually releasable locking means for retaining said slider member in said housing against the bias of said spring means; and

retaining projections extending from said central part of said bottom of said slider member in a direction which is away from said housing floor, said retaining projections being sized and shaped to receive and lock against rotation the winding hubs of a recording media cassette inserted in said slider member, said projections being arranged one behind



the other in the direction of movement of the slider member, the length of said guide rails and guide bars and the position of said stop means being selected such that both of said retaining projections are displaced outwardly with respect to said plane when said slider member is positioned at its limit of movement under the influence of said biasing spring means.

55. Apparatus for the storage of cassettes containing recording media comprising:

a housing, said housing being open at one narrow side and having a floor, said housing open side defining a plane which is generally transverse to said floor, said housing including a pair of internal guide rails which extend generally transverse to said plane, said guide rails each cooperating with said floor to define an open-sided guide channel;

a slider member, said slider member having a front wall, a rear wall and a bottom which extends between said front and rear walls, said slider member bottom comprising at least a central part including a plate shaped portion having a first planar side which faces said housing floor and a second planar side which faces from said housing floor, both of said slider member central part sides extending substantially parallel to said housing floor, said slider member further having guiding bar means cooperatively interengaged with said housing guide channels whereby said slider member is guided for linear movement relative to said housing, said guiding bar means including guide bars which are spaced laterally from and oriented generally parallel with respect to said central part, a portion of at least one of said guiding bar means being positioned closer to said housing floor than is the said first planar side of said central part;

spring means for biasing said slider member in the direction of said housing open side;

stop means for limiting the motion of said slider member in the direction of said spring means bias;

manually releasable locking means for retaining said slider member in said housing against the bias of said spring means;

said housing having a rear wall opposite its open side, said rear wall extending generally parallel to said plane;

said spring means comprising a helical spring interposed between said housing rear wall and said slider member rear wall;

spring guiding means extending from said housing bottom, said spring guiding means being at least in part disposed between said housing bottom and said at least one slider member central part first side when said slider member is inserted to its limit of motion in said housing toward said housing rear wall; and

retaining projections extending from said central part of said bottom of said slider member in a direction which is away from said housing floor, said retaining projections being sized and shaped to receive and lock against rotation the winding hubs of a recording media cassette inserted in said slider member, said projections being arranged one behind the other in the direction of movement of the slider member, the length of said guide rails and guiding bars and the position of said stop means being selected such that both of said retaining projections are displaced outwardly with respect to said plane when said slider member is positioned at its limit of movement under the influence of said biasing spring means.

4,702,373

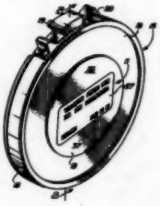
HUB COVER INTERACTING WITH REEL OF MAGNETIC TAPE FOR FORMING DOCUMENT STORAGE COMPARTMENT

Dan G. Meade, 3721 W. Kelton La., Phoenix, Ariz. 85023

Continuation-in-part of Ser. No. 832,360, Feb. 24, 1986, abandoned. This application Oct. 20, 1986, Ser. No. 920,730

Int. Cl.[4] B65D *21/04, 85/67*

U.S. Cl. 206—389 **8 Claims**



1. A device for storing documentation in the hollow hub of a magnetic tape reel comprising:

a pair of flat disc-shaped flanges, each having a planar surface and first and second means extending laterally one from each planar surface into the hub from a different end thereof with said first means overlapping said second means when the flanges are abuttingly arranged, one adjacent each side of the tape reel,

said first means being provided with protrusion means extending outwardly thereof for engaging the hub of the associated reel when inserted therein which hub causes a deflection of said first means toward and into frictional engagement with said second means when inserted in the hub,

said first and second means forming a compartment within

the hollow interior of the hub for document storage purposes,

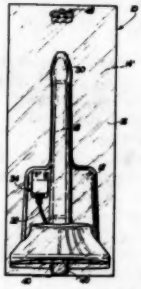
said first and second means each comprising an open cylinder, the diameter of which is slightly smaller than the diameter of the hub of the reel with the diameter of one of said means being slightly smaller than the other so as to telescopically engage the other when said flanges are each juxtapositioned to a different side of the reel.

4,702,374

PACKAGE ASSEMBLY WITH TESTING FEATURE FOR ILLUMINATED PRODUCT

Robert Kelner, 4101 NW. 132 St., Miami, Fla. 33054

Filed Apr. 21, 1986, Ser. No. 854,387
Int. Cl.[4] B65D *85/42*
U.S. Cl. 206—418 **10 Claims**



1. In a package assembly including a hollow interior portion at least partially defined by a surrounding wall structure and being of the type primarily designed to contain an illumination device on the interior thereof and display the illumination device for retail sale, the illumination device being electrically powered and connectable to an electric power source by a connecting plug, an improvement comprising:

(a) said wall structure comprising a transparent portion disposed in overlying relation to the illumination device and a base portion connected to said transparent portion,

(b) said transparent portion removably attached to said base portion and cooperatively configured therewith to define boundaries of said hollow interior portion,

(c) access means formed in said wall structure in aligned disposition with the connecting plug within said hollow interior portion, said access means comprising an access aperture formed in said wall structure in communication with said hollow interior portion and the connecting plug therein,

(d) anchor means connected to said wall structure and disposed within said hollow interior portion for secured positioning of the connecting plug within said hollow interior portion,

(e) said anchor means comprising a tongue element secured to said base portion and extending outwardly therefrom adjacent said access aperture and into said hollow interior portion,

(f) said tongue element including a sufficient longitudinal dimension to support and extend beyond the connector plug in substantially covering relation to one side of the plug, the connector plug being substantially hidden when viewing said hollow interior portion through said transparent wall portion,

(g) said acess aperture disposed to allow passage of the connector plug therethrough from said hollow interior portion and into connection with an electrical power source, and

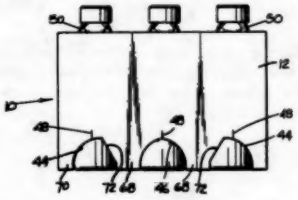
(h) said transparent portion cooperatively disposed with said illumination device for viewing of said illumination device therethrough when the connecting plug is connected to the electrical power source.

4,702,375

WRAP-AROUND CARRIER

Jerry F. Wilson, West Monroe, La., assignor to Manville Corporation, Denver, Colo.

Filed Nov. 1, 1985, Ser. No. 794,824
Int. Cl.[4] B65D *71/00*
U.S. Cl. 206—434 **12 Claims**



1. A wrap-around article carrier for carrying two adjacent rows of a predetermined number of adjacent identical articles the bottom portions of which are generally cylindrical in shaped and of predetermined dimensions, comprising:

a top panel;

a bottom panel;

side panels integral with and foldably connected to the top and bottom panels, the side panels having ends corresponding to the ends of the carrier;

the side panels containing a predetermined number of cutouts adjacent the folds connecting the side panels to the bottom panel, the number of cutouts in each side panel corresponding to the number of articles in each row of the articles to be carried by the carrier, each cutout having cut side edge portions and an upper edge portion, the cutouts nearest the ends of the carrier comprising end cutouts, the side edge portions of the end cutouts closest to the ends of the carrier comprising outer side edge portions, the other side edge portions of the end cutouts comprising inner side edge portions;

each cutout being located opposite the predetermined location of one of the articles in the carrier, the dimensions of the carrier and the cutouts being such that a portion of the bottom cylindrical portion of each article carried in the carrier protrudes through an associated cutout;

the end cutouts being located so that planes extending at substantially right angles to the side panels and passing through the predetermined locations of the centerlines of the generally cylindrical portions of articles protruding through the end cutouts are nearer the outer side edge portions of the end cutouts than the inner side edge portions of the end cutouts;

the dimensions and locations of the end cutouts being coordinated with the predetermined dimensions and predetermined locations of the articles protruding through the end cutouts so that such articles touch the inner side edge portions and the outer side edge portions of the cutouts; and

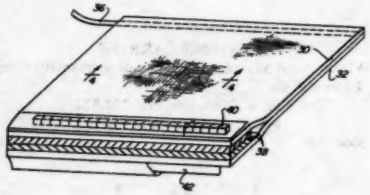
the contour of the upper edge portions of the cutouts being such that said upper edge portions are substantially in contact with articles protruding through the cutouts when the carrier is lifted.

4,702,376

COMPOSITE VACUUM BAG MATERIAL HAVING BREATHER SURFACE

Ernest H. Pagliaro, Orange, Conn., assignor to Fairprene Industrial Products Company, Inc., Fairfield, Conn.

Filed Oct. 3, 1986, Ser. No. 915,043
Int. Cl.[4] B65D *81/20*
U.S. Cl. 206—524.8 8 Claims



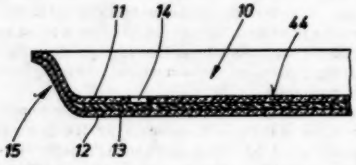
1. A vacuum bag for application to the surface of an article, said vacuum bag comprising a flexible fabric substrate impregnated with an elastomer, said substrate having a void free continuous layer of elastomer on one side, the other side having exposed fabric interstices providing air passageways between said other side and said article surface.

4,702,377

TRAY FOR RECEIVING FOODSTUFFS AND A PROCESS AND APPARATUS FOR PRODUCING IT

Horst D. Gröne, Schwanewede, Fed. Rep. of Germany, assignor to Lin Tec Verpackungstechnik GmbH, Fed. Rep. of Germany

Filed Nov. 19, 1985, Ser. No. 799,707
Claims priority, application Fed. Rep. of Germany, Nov. 20, 1984, 3442341
Int. Cl.[4] B65D *1/34, 6/04*
U.S. Cl. 206—557 4 Claims



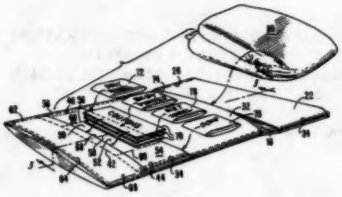
1. Tray for receiving liquid-secreting foodstuffs and delicacies, for example meat, fish or poultry, and having a basic tray body having a length and a width and consisting of liquid-tight plastic and an absorbent insert, characterised in that the basic body consists of two layers (11, 12) of liquid-tight plastic between which is embedded, centrally relative to a longitudinal plane between the layers, a liquid-absorbent insert (13), in that the upper layer (11) pointing towards the foodstuff has orifices (14), in that the insert (13) is strip-shaped with a smaller width than said two layers and extends over only a limited region of the tray, so that outside the region of the insert (13) the two layers (11, 12) are in direct contact with one another, in that said basic body has a bottom wall (44), in that the insert extends over the entire length of the two layers (11, 12), and in that the width of the insert (13) corresponds approximately to the width dimension of the bottom wall (44).

4,702,378

SANITARY, DISPOSABLE BABY CHANGE KIT

Henry Finkel, 342 Elm Avenue, Westmount, Quebec, Canada H3Z 1Z5, and Allan Thomas, 5518 Silverson Avenue, Montreal, Quebec, Canada H4V 2G5

Filed Sep. 30, 1986, Ser. No. 913,245
Int. Cl.[4] B65D *30/22*
U.S. Cl. 206—581 3 Claims



1. A sanitary, disposable baby change kit comprising:
(a) a body comprising a sheet of plastic film with an upper surface and a lower surface,
(b) a leading section and a trailing section situated at opposite ends of said body,
(c) said leading section being folded about itself and being secured to the upper surface of said body to form a pocket,
(d) a first fold being formed across said leading section to define the height of said pocket,
(e) said trailing section being folded about itself and being secured to the upper surface of said body to form a pouch,
(f) a second fold being formed across said trailing section to define the height of said pocket,
(g) said pouch being larger than said pocket,
(h) a diaper received within said pouch,
(i) the lower edge of said pocket being spaced a short distance from the upper edge of said pouch to permit access to said pouch and said diaper received therein when said body is unfolded,
(j) at least one plastic panel secured to said trailing section to define at least one compartment on the upper surface of said trailing section,
(k) baby care products stored within said compartment,
(l) said trailing section being inserted into said pocket after the trailing section has been folded about itself,
(m) sealing means securing the bottom surface of said trailing section to the upper surface of said leading section so that said diaper and said baby care products are enveloped and sealed in a sanitary manner within the confines of the kit prior to using the kit, whereby
(n) a soiled diaper and used baby care products can be reinserted into said pouch prior to re-folding the kit and disposing of same after using the contents of the kit to clean a baby's bottom.

4,702,379

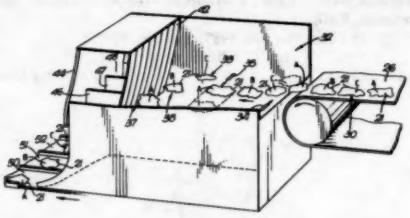
ORE SORTING APPARATUS

Colin G. Clayton, Abingdon, and Ramon Spackman, Didcot, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

PCT No. PCT/GB84/00164, § 371 Date Dec. 27, 1984, § 102(e) Date Dec. 27, 1984, PCT Pub. No. WO84/04707, PCT Pub. Date Dec. 6, 1984
PCT Filed May 15, 1984, Ser. No. 690,656
Claims priority, application United Kingdom, May 20, 1983, 8314029
Int. Cl.[4] B07C *5/02, 5/346;* G21G *1/06*
U.S. Cl. 209—539 8 Claims

1. An apparatus for sorting lumps of ore to detect the presence of a selected substance in the lumps, the apparatus comprising, an irradiator for irradiating the lumps of ore, detector means for detecting γ-rays emitted by the irradiated selected

substance in the irradiated lumps, and means for transporting the lumps from the irradiator to the detector, wherein the



transporting means includes at least one dividing means for separating the lumps into a plurality of streams on a non-random predetermined basis.

4,702,380

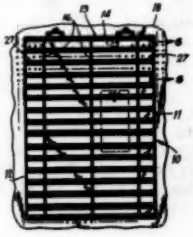
MERCHANDISE DISPLAY ASSEMBLY

David Herman, 33 Commerce Rd., Carlstadt, N.J. 07072

Filed Apr. 20, 1987, Ser. No. 39,719

Int. Cl.[4] A47F 7/00

U.S. Cl. 211—57.1 4 Claims



1. A merchandise display device comprising a spaced parallel pair of vertical strut members, a plurality of horizontally extending, vertically spaced apart bracket holder assemblies having their distal ends mounted to said strut members and defining with said strut members an open grid, said bracket holder assemblies comprising parallel upper and lower rods, said rods being spaced to define a mounting slot therebetween, the upper said rods of said assemblies being of smaller diameter than and more flexible than said lower rods, a plurality of bracket members removably supported on said holder assemblies, said bracket members including a generally horizontally directed merchandise support arm having a free end extending away from said grid, a mounting foot at the other end of said bracket members, said foot including a downwardly directed toe member contacting a front surface of a said lower rod, a horizontally disposed spaced pair of support fingers extending through said mounting slot, and a horizontally spaced apart, upwardly extending pair of stop lugs projecting vertically from said fingers and engaging a rear surface of said upper rod, said rods including a deformable polymeric coating whereby downward forces exerted against said support arm urge said toe member, fingers and stop lugs into partially embedded relation into said coating, whereby said brackets are rendered resistant to lateral movements relative to said rods.

4,702,381

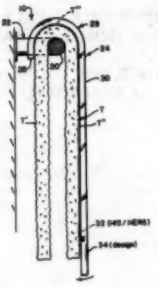
TOWEL PROTECTOR

Ransom M. Carter, and Ophelia L. Carter, both of 2219 Penrose Ave., Baltimore, Md. 21223

Filed Feb. 5, 1987, Ser. No. 11,014

Int. Cl.[4] A47F 5/08

U.S. Cl. 211—105.2 6 Claims



1. A system for protecting a hung towel from use by a careless or absent-minded user, characterized by the combination of a horizontal bar for a towel to be hooked over so that the towel hangs down in front and at the rear, a protector with integral first part and second part, means for hanging the protector over the towel on the horizontal bar, said second part proportioned for thereby extending downwardly from the first part and covering the front of the towel, and said first and second parts laterally extending substantially the width of and covering the horizontal bar.

4,702,382

ERECTABLE DISPLAY STRUCTURE WITH REPOSITIONABLE DISPLAY SHELF SECTIONS

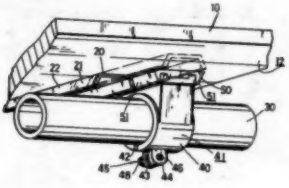
Yoshihiro Hoshino, Nagoya, Japan, assignor to Hoshino Gakki Co., Ltd., Japan

Filed Dec. 30, 1986, Ser. No. 947,812

Claims priority, application Japan, Jun. 24, 1986, 61-096608[U]

Int. Cl.[4] A47F 5/00

U.S. Cl. 211—134 9 Claims



1. A display comprising:

a shelf for being supported at a desired tilt orientation, the shelf having an underside;

a plurality of rails disposed to the underside of the shelf; each rail including a side surface thereon;

a supporting pipe disposed beneath the shelf and the rails and extending transversely past the rails; a respective clamp on the pipe for each of the rails of the plurality; each clamp being movable along the pipe and being clampable to the pipe at any selected location along the pipe; the clamp including an engagement part shaped for engaging the side surface of the rail for engaging the rail to the engagement part; the respective clamps and their engagement parts being so disposed that with each rail engaged

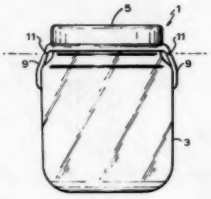
by a respective engagement part of a respective clamp, the shelf is supported on the rail and the rail is supported to the engagement part which is supported to the clamp and the clamp is supported to pipe, thereby to support the shelf to the pipe.

4,702,383

TAMPER PROOF PACKAGE

Harry Weader, Forest Hills, N.Y., assignor to Filtromatic Corp., Glendale, N.Y.

Filed Aug. 7, 1986, Ser. No. 894,119
Int. Cl.[4] B65D *41/34*
U.S. Cl. 215—232 4 Claims



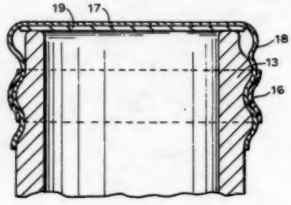
1. A tamper indicating package comprising
a container having a circular opening,
a cap removably mounted over said container opening,
and connecting means having an upper member affixed to said cap and at least one downwardly and outwardly extending tab means affixed to said container, said tab means having a frangible section intermediate the ends of said tab means adapted to break upon rotation of said cap relative to said container to provide a readily visible indication of tampering.

4,702,384

SCREW THREADED CLOSURE WITH ELASTOMERIC GRIP BAND

Sylvan W. Weiser, 10 Timothy Ct., Monsey, N.Y. 10952

Filed Sep. 10, 1986, Ser. No. 905,520
Int. Cl.[4] B65D *41/04*
U.S. Cl. 215—295 3 Claims



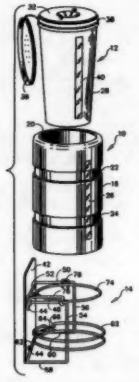
1. In combination with a receptacle screw cap formed of a stiff material and including a circular top wall and skirt wall depending from the periphery of said top wall, a separate grip member tightly engaging the outer face of said skirt wall and comprising an elastically stretched cylindrical elastomeric band of a width less than the height of said skirt wall and a circumference in its untensioned state less than that of said skirt wall, said band encircling said skirt wall and being under peripheral tension and pressing radially inwardly on the outside face of said skirt wall whereby to inhibit slippage between said band and skirt wall, the upper and lower edges of said band being spaced respectively below and above the upper and lower edges of said skirt wall.

4,702,385

HOSPITAL IN-ROOM DISPOSABLE CONTAINER

Richard A. Shillington, San Clemente, and Alec Oberschmidt, Leucadia, both of Calif., assignors to Med-Safe Systems, Inc., Encinitas, Calif.

Filed Mar. 26, 1987, Ser. No. 30,353
Int. Cl.[4] B65D *25/24*
U.S. Cl. 220—18 16 Claims



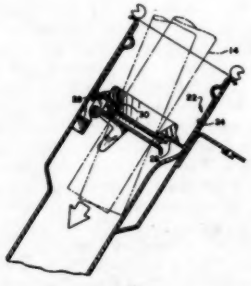
1. A disposable container assembly comprising:
a housing having a top and an opening in said top for receiving a disposable container;
a disposable container removably disposed in said opening within said housing; and
latch lock frame means for locking said disposable container in place in said housing.

4,702,386

FUEL FILLER PIPE SEAL

Dennis A. Boehmer, and Dale R. Piper, both of Xenia, Ohio, assignors to Vernay Laboratories, Inc., Yellow Springs, Ohio

Filed Jun. 6, 1986, Ser. No. 871,357
Int. Cl.[4] B67D *5/04*
U.S. Cl. 220—86 R 7 Claims



1. In combination with a fuel filler pipe having an upper end and a seal mounting bracket attached to said upper end of said pipe, said bracket including an annular, radially inwardly projecting flange having an inner end and vent means formed therein and terminating in a seat at said inner end and a seal having a longitudinal axis and including a fuel nozzle engaging portion formed on an inner surface of said seal, an integrally formed umbrella valve overlying said vent means, and means

defining an annular groove in an outer surface of said seal and receiving said seat therein, the improvement comprising:

said fuel nozzle engaging portion comprises an inwardly projecting lip positioned intermediate upper and lower ends of said seal, and

said lip lies substantially in a plane normal to said longitudinal axis of said seal and intersecting said groove.

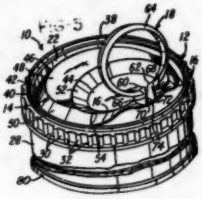
said seal having an upper portion having an uninterrupted inner surface flaring upwardly and outwardly and a lower portion having a downwardly and outwardly flared inner surface joined to said inner surface of said upper portion and an outer surface converging downwardly to said inner surface.

4,702,387

CONTAINER AND PLASTIC CLOSURE THEREFOR

Harry A. E. Wombold, New Vienna, Ohio, assignor to Packaging Resources Inc., New Vienna, Ohio

Filed Nov. 24, 1986, Ser. No. 933,991
Int. Cl.⁴ B65D *17/34*
U.S. Cl. 220—270 **17 Claims**



1. A one-piece molded plastic closure comprising:

an outer rim having a generally horizontal top wall, an outer wall depending from said top wall, and an inner wall depending from said top wall, said walls defining a downwardly opening container brim-receiving channel for sungly receiving the brim of a container;

a thin-walled center panel having an outer periphery slightly smaller than the inner periphery of said inner wall;

a rupturable web connecting between the outer edge of said center panel and the inner surface of said inner wall of said rim around the entire periphery of said center panel; and

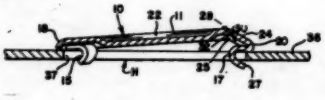
means for removing said center panel in one unbroken piece from said rim comprising a relatively rigid pedestal projecting upwardly from said center panel adjacent its said outer periphery and flexible pull strap means connected to said pedestal, said pedestal having an outwardly projecting foot extending outwardly of the points of connection of said pull strap means to said pedestal.

4,702,388

LOCKING CLOSURE

Fred S. Boyer, 6188 80th St. North, Princeton Bldg., Apt. 311, St. Petersburg, Fla. 33709, and Wayne A. Boyer, 1324 Greenleaf, Evanston, Ill. 60201

Filed Mar. 28, 1986, Ser. No. 845,577
Int. Cl.⁴ B65D *51/12*
U.S. Cl. 220—305 **10 Claims**



1. In a plug for plugging holes in sheet material wherein the plug includes a generally planar disc divided into a pair of portions joined to each other, and in which at least one of the portions is angularly displaceable from the plane of the disc at the juncture between the portions, the improvement therein comprising;

a groove positioned at said juncture, said groove having a substantial depth relative to the thickness of the disc such that the resistance of the disc to bending along said groove is substantially reduced; and

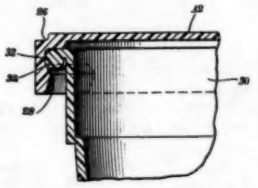
at least one land across said groove.

4,702,389

RIGID LID SYSTEM

Matthew J. Bozinovich, Libertyville, and Robert M. Fontana, Niles, both of Ill., assignors to Kraft, Inc., Glenview, Ill.

Continuation of Ser. No. 196,360, Oct. 14, 1980, abandoned. This application Sep. 2, 1982, Ser. No. 414,463
Int. Cl.⁴ B65D *43/10, 5/68, 21/02*
U.S. Cl. 220—306 **5 Claims**



1. A rigid organopolymeric lid for an associated wide mouthed container having an outwardly projecting lip for engagement therewith comprising:

a circular top panel having a diameter in the range of from about 3 inches to about 6 and one-half inches,

a generally cylindrical skirt depending from said top panel having an inner diameter approximating the outer diameter of said container lip,

a plurality of at least about 6 regularly spaced bead elements projecting inwardly from said skirt and spaced apart from said top panel to form an interrupted bead at regularly spaced intervals along the inner surface of said skirt, said bead elements having a total length along the inner circumference of said skirt in the range of from about 60 to about 90 percent of the length of said inner circumference of said skirt, said top panel, skirt and bead elements being integrally formed of a rigid organopolymer having a flexural modulus of elasticity of at least about 1.5×10^5 psi, and said lid having a rigidity to flexure such that a centrally applied flexure force of at least about 6 pounds is required to deflect said lid one quarter inch when supported at a support spacing of 2¼ inches, said lid having a rigidity such that the maximum force applied by flat compression elements at a compression speed of 0.1 inch per second to flex said lid in compression is at least about 3 pounds, and said regularly spaced bead elements providing for secure closure to said associated wide mouthed container while permitting ready removal and replacement of said lid in respect to said container.

4,702,390

COMPOSITE PLANT HOLDERS AND METHOD OF MAKING THEM

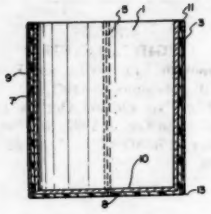
Robert C. Rinkovsky, Sr., R.D. 1, Central Ave., Whitehouse Station, N.J. 08889

Filed Sep. 18, 1986, Ser. No. 908,642
Int. Cl.⁴ B65D *90/04*
U.S. Cl. 220—453 **9 Claims**

1. A method of making a composite plant holder which comprises:

(a) forming the external vertical shape of the desired plant holder by shaping metal sheet and then permanently attaching opposite ends of the metal sheet to one another;

(b) providing said metal sheet with 180° folded lips over portions at the top and bottom of said metal sheet;
(c) placing the vertically formed metal sheet on a flat, non-adhering surface in its vertical position;
(d) gel coating the inside walls of said metal sheet and the open bottom formed by the metal sheet and the flat, non-



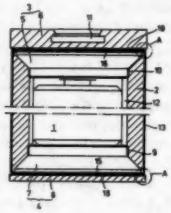
adhering surface, with a gel coat for subsequent application of fiberglass;
(e) applying a mixture of resin and fiber on the inside walls against the aforesaid gel coat and down onto the bottom thereof; and,
(f) cutting any resin and fiber which extends beyond the top of said sheet metal.

4,702,391

CONTAINMENT WITH LONG-TIME CORROSION RESISTANT COVER FOR SEALED CONTAINERS WITH HIGHLY RADIOACTIVE CONTENT

Rainer Koester, Karlsruhe; Emanuel Smallos; Werner Schwarzkopf, both of Eggenstein-Leopoldshafen, and Arthur Kiesow, Dueren, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Nov. 7, 1985, Ser. No. 795,846
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447278
Int. Cl.[4] G21F *5/00*
U.S. Cl. 220—456 **6 Claims**



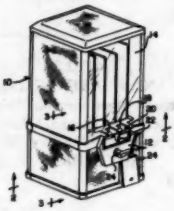
1. A containment with a corrosion resistant protective cover adapted for the reception of a tightly sealed container with radioactive content such as a steel enclosure containing radioactive waste melted into glass and burnt-out nuclear fuel elements for storage of said container, said containment comprising a metallic hollow containment cylinder, a lid and bottom to be mounted onto opposite ends of said cylinder, corrosion a protective liner completely surrounding said cylinder including said lid and said bottom, a cover plate provided with a corrosion protective layer mounted on said lid with said layer adjacent said liner, and a bottom plate provided with a corrosion protective layer mounted on said bottom with said layer adjacent said liner, each of said cover and bottom plates having a diameter larger than that of the containment cylinder and said corrosion protective liners and layers consisting of the same material which is different from that of which said containment cylinder and said top and bottom plates consist.

4,702,392

VENDING MACHINE

Isadore B. Rachman, Philadelphia, Pa., assignor to U-Seal-It Vending Co., Inc., Philadelphia, Pa.

Filed Apr. 30, 1986, Ser. No. 857,922
Int. Cl.[4] B65H *3/24*
U.S. Cl. 221—151 **6 Claims**



1. In a flat package vending machine of the type including a flat package vend assembly having a reciprocating vend plate, a rearward flange downwardly depending from the vend plate, a reciprocal channel member positioned to be contacted by the depending flange and a vend lever in releasable contact with the vend plate to pull the vend plate and the channel member forwardly for flat package vending, the improvement comprising

a rotary coin accepting assembly affixed to the vending machine and being capable of being rotated upon acceptance of a proper coin;
a cam means positioned rearwardly of the coin accepting assembly and being rotatable by the coin accepting assembly,
the cam means comprising a generally cylindrical, hollow cam, the cam having a curved cam surface; and
an activator rod secured to the channel member, the activator rod being positioned to be contacted by the curved cam surface to drive the channel member and vend plate rearwardly upon rotation of the coin accepting assembly, the activator rod being pulled forwardly by the vend lever upon each vend cycle,
the activator rod comprising an elongated body, the body terminating rearwardly in a connection end and forwardly in a downwardly depending round finger, the connection end being secured to the channel member,
the depending finger being in rolling point contact with the curved cam surface when the rotary coin accepting assembly is rotated.

4,702,393

COMPENSATING DILUTER/DISPENSER

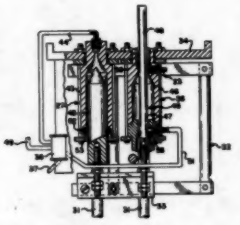
Bu S. Chen, Miami, Fla., assignor to Hyperion, Inc., Miami, Fla.

Filed Feb. 7, 1985, Ser. No. 698,938
Int. Cl.[4] B67D *5/30*
U.S. Cl. 222—1 **11 Claims**

1. A compensating precision diluter/dispenser apparatus, comprising:

a piston and cylinder syringe assembly for receiving and dispensing fluids, said piston and cylinder syringe assembly having a plurality of piston positions, each piston position corresponding to an expected volume of fluid to be moved by the piston and cylinder syringe assembly;
a drive assembly for effecting positive displacement of the piston with respect to the cylinder of the syringe assembly;
regulating means for controlling the drive assembly, the regulating means including means for storing piston posi-

tion and fluid volume data generated during a calibrate mode of the piston and cylinder syringe assembly, the regulating means further including means for varying the stroke length of the piston in view of said piston position and fluid volume data and for thereby compensating for deviations between said expected volume of each said piston position and a delivered volume of fluid that is actually moved by the piston and cylinder assembly at each said piston position of the piston and cylinder syringe assembly, said means for storing data stores data derived from measurements corresponding to a plurality of said delivered volumes, said measurements having been empirically generated during initial calibration of said piston and cylinder syringe assembly, and wherein said regulating means utilizes said stored data to control said stroke-length regulating and compensating means;



selector means for permitting an operator to designate an expected volume to be moved by the piston and cylinder syringe assembly, said selector means being in operative communication with said regulating means; and

said regulating means automatically varies the piston stroke length whereby the delivered volume of fluid is substantially identical to the expected volume designated at the selector means substantially throughout said plurality of piston positions.

4,702,394

DISPERSING SUPPLY DEVICE IN AUTOMATIC WEIGHING APPARATUS

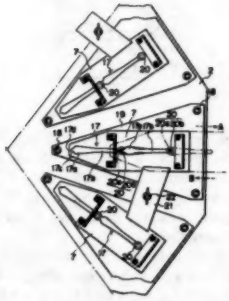
Koichi Katzoka, Kurita, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan

Filed Oct. 19, 1983, Ser. No. 543,328

Claims priority, application Japan, Oct. 19, 1982, 57-157752[U]

Int. Cl.⁴ F16B *1/00*; G01G *13/00, 17/04*

U.S. Cl. 222—77 **5 Claims**



1. A dispersing supply apparatus including a plurality of dispersing supply devices, disposed at the periphery of a dispersing table and mounted on a support structure for supplying a plurality of weighing hoppers with articles to be weighed, the weighing hoppers being arrayed about the periphery of said dispersing supply devices, each of said dispersing supply devices comprising:

a base plate, integral with said dispersing supply device, having at least one mounting slot with two first, wide portions and two second, narrow elongated portions contiguous to the first, wide portions, said base plate being aligned in a direction from the dispersing table to the associated weighing hopper;

a plate member to which said base plate is attached, said plate member mounted on the support structure;

pins projectively provided on said plate member, each having a head portion of a first diameter and a shaft portion of a second diameter, said first diameter being larger than said second diameter so that the head portions of said pins are inserted in said first portion of said slot and so that said shaft portions of said pins are engaged with the second portion of said mounting slot by sliding said base plate; and

releasable retaining means spanning adjacent base plates for inhibiting movement of said dispersing supply devices away from their operation position when said dispersing supply devices are in use, by inhibiting movement of said dispersing supply devices relative to the support structure in the direction from the dispersing table to the weighing hopper associated with said dispersing supply devices.

4,702,395

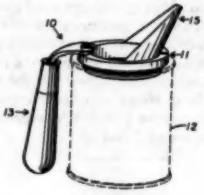
PAINT CAN HANDLE AND SPOUT ATTACHMENT

Reinhold Nitsch, 4423 44B Avenue, Delta, British Columbia, Canada

Filed Sep. 24, 1984, Ser. No. 653,342

Int. Cl.⁴ B65D *25/28*

U.S. Cl. 222—109 **8 Claims**



1. A combination handle and pour spout for a paint can which comprises:

an annular member adapted to be inserted into the lip of a paint can, said annular member provided with an interruption separating closely spaced, confronting ends of said annular member, said annular member having an upper section having a top surface, and a lower grooved section, the lower section having the same opening as the upper section, but of smaller outer diameter,

a pour spout extending upwardly from the top surface of the upper section at a location which is diametrically opposite to said interruption,

a generally L-shaped handle having:

(1) a first portion overlying and pivotally mounted to the top surface of said annular member on one side of said interruption,

(2) a second portion located radially outside of said annular member, and extending downwardly drom said first portion and below the second section of said annular member, said second portion having a gripping member adapted to extend along the side wall of a paint can when the handle and pour spout is installed thereon, and

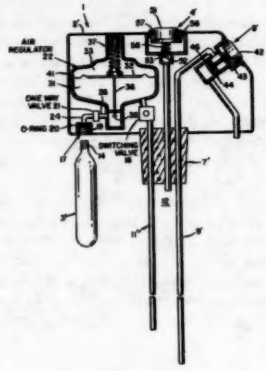
handle locking means mounted to the top surface of said annular member on the opposite side of said interruption.

4,702,396

APPARATUS FOR PRESERVING AND DISPENSING WINE

Ronald E. Gwiazda, 143 Mt. Vernon St., West Roxbury, Mass. 02132

Filed Feb. 10, 1986, Ser. No. 827,728
Int. Cl.[4] B65D *83/14*
U.S. Cl. 222—152 **7 Claims**



1. A portable wine dispensing device comprising an apparatus for mounting on an individual wine bottle, including a wine bottle closure member, support means for supporting a removable inert gas cartridge, a gas purge valve, a wine dispensing valve, an extended gas feeder conduit and an extended wine feeder conduit coupled to said dispensing valve, a one-way valve, gas feeder conduit means for supplying gas under pressure from said gas cartridge to said extended gas feeder conduit through said one-way valve, pressure regulator means coupled between said gas cartridge and said extended gas feeder conduit for controllably starting and stopping the flow of gas from said cartridge to maintain the pressure in the bottle at a substantially constant level above atmospheric pressure, and gas purging gas conduit means coupled between said gas purge valve and inside portions of said bottle.

4,702,397

PRESSURIZED FLUID DISPENSER

Norman Gortz, Newport Beach, Calif., assignor to Infusion Systems Corporation, Irvine, Calif.

Filed Sep. 18, 1984, Ser. No. 651,835
Int. Cl.[4] B65D *37/00*; A61M *5/005*
U.S. Cl. 222—211 **13 Claims**

2. A device for dispensing a fluid, comprising:

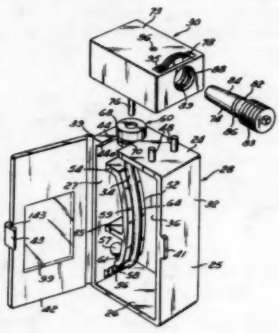
a bladder assembly comprising:

a substantial tubular length of elastomeric material having an open end and a closed end forming a bladder;

a self-closing valve assembly, said valve assembly in fluid communication with said open end of said length of elastomeric material;

a main housing to which said valve assembly is attached, having a fixed, curved surface, wherein said closed end of said length of elastomeric materials is fixedly attached adjacent one end of said curved surface, and wherein said valve assembly of said bladder assembly is fixedly attached to said main housing near the other end of said curved surface, so that said length of elastomeric material is stretched over said curved surface for pressurizing said fluid;

a flow controller removably attached to said valve assembly to regulate the flow of fluid out of said bladder, said flow controller comprising a body having a fluid flow path through said body, including an inlet passage and an outlet passage, the flow controller further comprising a probe, said probe coupled to said inlet passage so that as said flow controller is attached to said main housing said probe enters through said valve assembly into the open end of said bladder, thereby opening said valve assembly so long as said flow controller is attached to said main housing, while permitting said valve assembly to close whenever said flow controller is removed from said main housing, said flow controller body further including a cavity, a



portion which forms a segment of said fluid flow path, said flow controller further comprising:

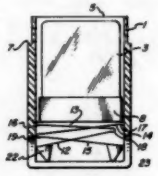
a shut-off element having substantially the same shape as said cavity, wherein said shut-off element is movable within said cavity to adjustably fill said cavity and provide selective amounts of obstruction to said fluid flow path, and wherein a portion of said shut-off element is sealed from said fluid flow path.

4,702,398

PRODUCT DISPENSER WITH ADVANCE/RETRACT-TYPE DELIVERY MEANS

Richard H. Seager, Mystic, Conn., assignor to Risdon Corporation, Naugatuck, Conn.

Filed Jan. 24, 1986, Ser. No. 822,036
Int. Cl.[4] B67D *5/42*; B65D *35/56*
U.S. Cl. 222—386 **34 Claims**



1. A dispenser for a product comprising:

a container defined by a plurality of walls with opening means at the lower end thereof:

a cup adapted to support said product to be dispensed from said container, wherein said cup is slidably supported within said container;

delivery means to slidably move said cup within said container, said delivery means including a first arm and a second arm each having a first end and a second end with both said first ends connected to said cup, said first arm and said second arm extending downwardly within said container beneath said cup so that said cup is advanced upwardly within said container by pushing the second ends of said first and second arms together; and

manipulation means disposed adjacent the opening means of

said container in a position where application of pressure at said manipulation means through said opening means in a direction substantially normal to the walls of said container moves the second ends of said first and second arms together and advances said cup upwardly.

4,702,399

DISPENSER

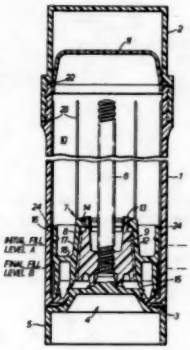
John W. Davis, Dorset, United Kingdom, assignor to Metal Box p.l.c., Reading, England

Filed Oct. 16, 1985, Ser. No. 788,143

Claims priority, application United Kingdom, Apr. 1, 1985, 8508430

Int. Cl.⁴ A45D *40/04*

U.S. Cl. 222—390 **18 Claims**



1. A dispenser for semi-solid material in stick form, having a tubular barrel for housing the material and a drive mechanism for moving material axially of the barrel for dispensing at an open end thereof, the drive mechanism comprising an actuator adapted to be rotated by hand and an elevator which is driven axially of the barrel to move material therealong on rotation of the actuator; wherein the elevator comprises a radially outer part adapted to engage and hold the material for moving the same along the barrel in either direction, and a radially inner part separate from the outer part and adapted to be drivingly engaged by the actuator; the inner part of the elevator is received within the outer part of the elevator and engages therewith over an interface extending around the axis of the barrel; first engaging means are provided at the interface for preventing relative rotation of the inner and outer parts of the elevator after assembly, and second engaging means for snap-securing said inner and outer parts together by relative axial movement of said inner and outer parts without relative rotary orientation.

4,702,400

AEROSOL DISPENSING METERING VALVE

John S. Corbett, Horsham, England, assignor to Fisons plc, Ipswich, England

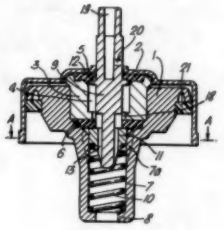
Filed Nov. 16, 1984, Ser. No. 672,401

Claims priority, application United Kingdom, Nov. 18, 1983, 8330851

Int. Cl.⁴ B65D *83/06*

U.S. Cl. 222—402.2 **13 Claims**

1. An aerosol dispensing metering valve for use in a breath-actuated device with a container for pressurised material, the valve comprising a valve body with a single internal metering chamber, the metering chamber having a base provided with an aperture, outer and inner seals closing the respective outer and inner ends of the metering chamber, a longitudinal valve member cooperating with the seals and movable within the aperture between an inoperative position in which the chamber is isolated from the atmosphere while the chamber communicates with the interior of the container, and an operative position in which the contents of the chamber can be discharged to the atmosphere while the chamber is isolated from the interior of the container, the valve member having a lower valve stem portion adapted to slidably engage the inner seal when the valve is in the inoperative position, and at least two channels extending longitudinally on the lower valve stem portion for communicating between the metering chamber and the interior of the container,



the aperature being of such size that immediately above the inner seal there is an annular space of width 0.1 to 2 mm between the valve member and the walls of the aperture, and the channels being between 0.2 and 1.5 mm deep, such that the sum of the width of the annular space and the depth of the channels is at least 1 mm and the exit of air trapped in the metering chamber and the entry of pressurised material into the chamber is readily allowed when the valve is in the inoperative position.

4,702,401

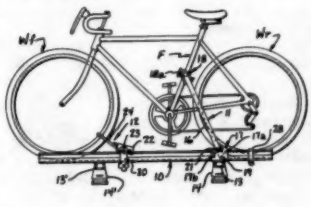
BICYCLE SUPPORT DEVICE

Joseph V. Graber, Middleton, and Ervin L. Severson, Oregon, both of Wis., assignors to Graber Products, Inc., Madison, Wis.

Filed Jan. 28, 1987, Ser. No. 7,606

Int. Cl.⁴ B60R *9/04*

U.S. Cl. 224—42.03 B **14 Claims**



1. A bicycle support device comprising a channel having an open side for receiving the wheels of a bicycle; bicycle frame engaging means for supporting the frame of a bicycle in a longitudinal medial plane generally bisecting the channel with the bicycle wheels at a preselected location, toggle wheel clamp means adapted to engage a wheel of the bicycle for drawing the wheel in a direction having one component toward the channel and a second component lengthwise of the channel, the wheel clamp means including (a) a bracket mounted on the channel for adjustment therealong to a position spaced from one of the wheels of the bicycle, (b) a lever pivotally mounted intermediate its ends on said bracket for movement about a lever axis crosswise of said longitudinal medial plane of the channel, (c) a wheel engaging hook, (d) shank means connecting the wheel engaging hook to one end

of the lever for relative pivotal movement about a second pivot axis paralleling said lever pivot axis, the wheel engaging hook extending crosswise of said longitudinal medial plane of the channel, the wheel engaging hook being swingable relative to said lever to a position in which the hook is offset from the open side of the channel to engage a bicycle wheel at a location spaced from a plane through the open side of the channel, the lever being pivotally movable about said lever axis between a clamp position in which the lever draws the wheel engaging hook in a direction inclined at an acute angle to the channel to a preselected position relative to the bracket and a release position in which the hook is spaced from the bracket a distance greater than said preselected distance.

4,702,402

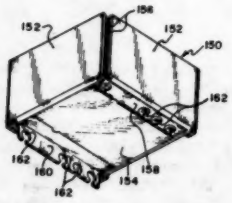
PRODUCT COUPON CONTAINER ATTACHABLE TO SHOPPING CART

Vincent J. Ferri, 1 Peachtree La., Burlington, N.J. 08016

Filed Oct. 17, 1986, Ser. No. 920,216

Int. Cl.[4] B62D *39/00*

U.S. Cl. 224—277 **18 Claims**



1. A product coupon container device to attach to a shopping cart and more particularly to the rear horizontal upper edge bar of the basket and to the horizontal bar at the top of the opened infant seat back of the shopping cart comprising:

(a) a box container having a length and width, both dimensions being sufficient receive the largest of product coupons, the container further having a bottom and four upright sides,

(b) a lip top member covering and enclosing the contents of the container hingeably attached to the top edge of one of the upright sides,

(c) attachment means to attach the container to the rear upper edge bar of the basket and to the horizontal bar of the seat comprising:

(i) a pair of horizontal members hingeably attached and extending downwardly from the container's two lengthwise bottom edges to pivot inwardly and under the box container, and

(ii) a plurality of cut-out transverse holes cut out of the horizontal members spaced along the length of the members, said holes not only opening to the sides of the members, but further opening downwardly through the bottom edge of the members.

4,702,403

RAIL BREAKER

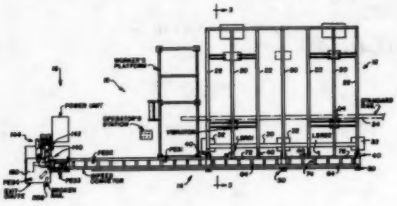
Curtis T. Curles, Cordele, Ga., assignor to Harris Press & Shear, Inc., Cordele, Ga.

Filed May 2, 1984, Ser. No. 606,128

Int. Cl.[4] B26F *3/00;* **B23P** *17/02*

U.S. Cl. 225—96.5 **20 Claims**

1. Shearing apparatus for cutting railroad track rails into predetermined lengths including feed means for sequentially feeding rails, said feed means includes an inclined feed table comprised of a frame member supporting a plurality of support arms on which a supply of rails can be supported, vibrator means to vibrate a predetermined number of said plurality of support arms and rail feed means for feeding individual rails sequentially, wherein said rail feed means includes a stop member extending along the length of the frame member, a plurality of rail lifting means for lifting an individual rail upwardly from the plane established by the supporting surface of the support arms, each of said rail lifting means being positioned adjacent the lowermost part of one of said plurality of support arms or wherein said rail lifting means has an inclined upper surface that has a steeper incline than the incline of said feed table, advancing means for advancing the fed rails to predetermined positions, clamping means for clamping the fed rails when advanced a desired amount so as to expose one side of the bottom flange of the rail, shear means positioned directly



adjacent said clamping means for shearing less than one half of the bottom flange of said rail thereby defining a shear plane, breaker means mounted downstream for said clamp means and said shear plane for breaking the rail adjacent said clamp means at the point where said bottom flange was sheared, control means for automatically controlling the operation of said apparatus, and sensing means for continuously sensing the position of a rail together with the position of said clamping shearing and breaking means for generating signals corresponding to the sensed conditions, whereby said control means receives the signals generated by said sensing means and controls the operation of said shearing apparatus in response thereto.

4,702,404

METHOD AND APPARATUS FOR REGULATING SPEED OF A LONGITUDINALLY MOVING FIBER

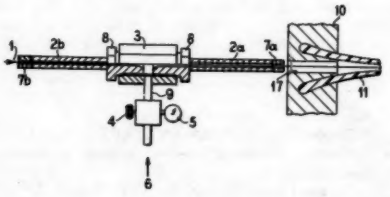
Guenter Einsle, Munich, and Ernst Mayr, Starnberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 13, 1985, Ser. No. 711,359

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1984, 3409376

Int. Cl.[4] B65H *51/30;* **G02B** *6/44*

U.S. Cl. 226—7 **13 Claims**



1. A method for regulating the speed of an axially moving optical waveguide as the waveguide is inserted into a lead sheath, said method comprising the steps of conducting the axially moving optical waveguide through two capillary tubes having axially aligned bores with a different inside diameter and through a chamber member being interposed between the two capillary tubes, applying a flowing medium, which is a viscous liquid acting as a filling compound for the waveguide, under pressure to the interior of the chamber member with the medium flowing in opposite directions through the bores of the

two capillary tubes and flowing out of the opposite opened ends of the tubes with the majority of the medium flowing from an outer end of the capillary tube having the bore with the larger inside diameter to create a force on the optical waveguide in the direction of the flow of the medium in said capillary tube with the bore with the larger inside diameter to shoot the waveguide and filling compound into the lead sheath.

4,702,405

FRICTION WELDING APPARATUS

Allan R. Thomson, and Thomas V. Heath, both of Rosshire, Scotland, assignors to Thomson Welding & Inspection Ltd., Rosshire, Scotland

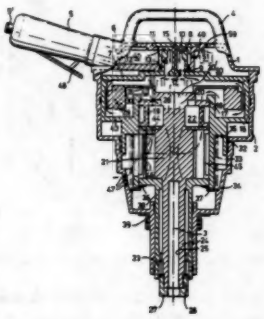
PCT No. PCT/GB86/00241, § 371 Date Dec. 30, 1986, § 102(e) Date Dec. 30, 1986, PCT Pub. No. WO86/06664, PCT Pub. Date Nov. 20, 1986

PCT Filed May 7, 1986, Ser. No. 2,715

Claims priority, application United Kingdom, May 10, 1985, 8511856; Jun. 4, 1985, 8514115; Jun. 10, 1985, 8514609; Jun. 17, 1985, 8515271

Int. Cl.[4] B23K *20/12, 27/00*

U.S. Cl. 228—2 **8 Claims**



1. Friction welding apparatus comprising a housing (1,2); a workpiece support (20',24) rotatably and axially movably mounted in the housing (1,2); a fluid pressure operated drive (20) coupled to the workpiece support for causing the workpiece support to rotate relatively to the housing; resilient means (33) for urging the workpiece support in a first axial direction relatively to the housing (1,2); pressure means (7) responsive to fluid pressure to move the workpiece support relatively to the housing in a second axial direction opposite to the first direction; a fluid inlet (6) in the housing; fluid conveying means (40,41,42,50) for communicating fluid under pressure from the inlet (6) along a first path to the drive (20) and along a second path to the pressure means (7); and control means (8,9,11,14) responsive to axial movement of the workpiece support in the housing for controlling the fluid pressure communicated along the first path whereby as the workpiece support moves in the housing under the influence of the pressure means (7), the first path is gradually closed while the second path remains open.

4,702,406

FORMING STABLE WELDED JOINTS BETWEEN DISSIMILAR METALS

Dennis Sullivan, and Richard J. Bloch, both of Raleigh, N.C., assignors to Carolina Power & Light Company, Raleigh, N.C.

Filed Oct. 16, 1986, Ser. No. 919,857

Int. Cl.[4] B23K *1/04*

U.S. Cl. 228—200 **26 Claims**

1. A metal workpiece including dissimilar metals and having increased resistance to chemical corrosion and mechanical stress and having greatly extended service life, said workpiece comprising:

a low alloy steel portion;

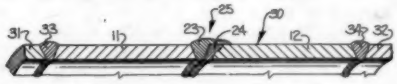
an austenitic stainless alloy steel portion; and

a welded joint uniting said low alloy steel portion and said austenitic stainless steel portion, said welded joint comprising;

a first deposit of a substantially nonferrous nickel-based alloy fused to said austenitic stainless steel portion; and

a second deposit of a carbide-stabilizized niobium-containing low alloy steel fused to said low alloy steel portion and to said first deposit;

said second deposit comprising a solid solution wherein substantially all carbon is present in the form of precipitated carbon-stabilized niobium carbides such that carbon or other carbon compounds will not migrate throughout said welded joint, thereby preventing migration-related



conditions that lead to failure of said joint and of said workpiece.

9. A welded joint formed between low alloy steel and austenitic stainless alloy steel and having a greatly extended service lifetime and greater resistance to chemical corrosion and mechanical stress, said joint comprising:

a first deposit of a substantially nonferrous nickel-based alloy fused to a portion of austenitic stainless alloy steel to be welded;

a second deposit of a carbide-stabilized, niobium-containing low alloy steel fused to a portion of low alloy steel to be welded and to said first deposit;

said second deposit comprising a solid solution wherein substantially all carbon is present in the form of precipitated carbon-stabilized niobium carbides such that carbon or other carbon compounds will not migrate throughout said welded joint, thereby preventing migration related failure of said joint.

4,702,407

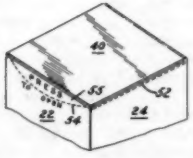
FLAT TOP CONTAINER AND BLANK FOR CONSTRUCTING SAME

Robert E. Lisiecki, West Bloomfield, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed May 30, 1986, Ser. No. 868,463

Int. Cl.[4] B65D *5/40*

U.S. Cl. 206—624 **14 Claims**



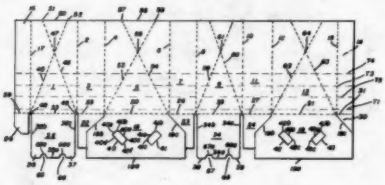
1. A thermoplastic coated container comprising:

(a) body panels including front and back panels and a pair of side panels;

(b) a pair of side fold-in edge panels integrally connected by first and second horizontal weakened lines to the top end of said pair of side panels and folded on said first and second horizontal weakened lines inwardly toward one another;

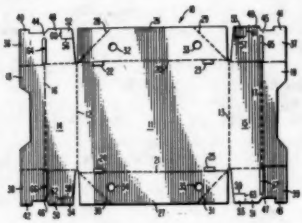
(c) a front panel integrally connected by a first horizontal score line to the top end of said front panel;
(d) a cover panel integrally connected by a second horizontal score line to said back body panel and folded on said second horizontal score line onto and secured to said side fold-in edge panels and to said front;
(e) a third weakened line operatively connected to said front panel and adapted to being manually broken to permit further breaking of said first and second weakened lines by the manual lifting of said cover panel; and
(f) a layer of one of aluminum foil, thermoplastic film and hot melt secured to the inside surfaces of the container covering the first and second horizontal weakened lines and the first horizontal score line and to segments of the immediately adjacent panel surfaces.

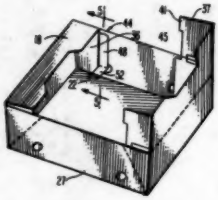
4,702,408
BULK BIN
Edward J. Powlenko, Cincinnati, Ohio, assignor to The Mead Corporation, Dayton, Ohio
Filed May 23, 1986, Ser. No. 867,245
Int. Cl.[4] B65D 5/10
U.S. Cl. 229—101 **6 Claims**



1. A bulk bin formed of a unitary sheet of material comprising one pair each of side and end panels and two pairs of corner panels foldably joined to form a tubular structure of polygonal cross sectional configuration and said tubular structure having closure structure at one end including a pair of primary closure panels foldably joined respectively to the end edges of said side panels at one end thereof, a closure flap foldably joined to an edge of each of said corner panels at said one end of said tubular structure and disposed in flat face contacting relation with one of said primary closure panels, a pair of locking panels having an end edge and a pair of side edges and foldably joined respectively to an edge of each of said end panels at said one end of said tubular structure and folded into flat face contacting relation with said closure flaps and said primary closure panels and interlocked with said primary closure panels so as to secure said closure flaps between said primary closure panels and said locking panels, a pair of diagonal locking slots of hexagonal configuration formed in each of said primary closure panels for respectively receiving locking tabs formed at the corners of different ones of said locking panels, each of said locking panels including a pair of notches each having a base line parallel to the edge of the associated end panel at said one end of said tubular structure and formed in the edge of the associated locking panel remote from the associated end wall to define a pair of corner locking tabs and wherein each of said diagonal locking slots is a generally rectangular configuration having parallel side edges and parallel end edges, the side edge nearest the adjacent edge of the associated side wall being shorter than the other side edge and its ends being connected respectively with the adjacent ends of the end edges to form a pair of truncated corners one of which is approximately parallel to said adjacent edge of the associated side wall and the other of which is approximately perpendicular thereto, a side edge of one locking panel being disposed in abutting coinciding intimate contact with said one truncated corner of an adjacent locking slot and said base line of said one locking panel being disposed in abutting coinciding intimate contact with said other truncated corner of said adjacent locking slot when the locking tab adjacent said side edge of said one locking panel is inserted into said locking slot thereby to enhance stability of the bin.

4,702,409
TRAY WITH REINFORCED CORNERS
Edward L. Osborne, Kansas City, Kans., assignor to Westvaco Corporation, New York, N.Y.
Filed Jul. 10, 1986, Ser. No. 884,095
Int. Cl.[4] B65D 5/30
U.S. Cl. 229—125 **1 Claim**





1. A tray with reinforced corners prepared from a single blank of material comprising:
(a) a substantially centrally located bottom panel of generally rectangular shape having side and end walls foldably attached to the ends thereof, said side and end walls having outer edges and ends, said end walls also containing diagonally oriented score lines which extend from their outer edges toward the corners of said bottom panel to permit the end wall to be folded inwardly when the end walls and side walls are collapsed onto the bottom panel for shipping and storage of the tray;
(b) a pair of top closure panels of abbreviated width foldably attached to the outer edges of the side wall panels, said top closure panels having ends;
(c) corner connecting flaps foldably attached to each end of each of the side wall panels which include integral locking tabs formed in the lower edges thereof by intersecting fold and cut lines; and,
(d) corner reinforcing flaps foldably attached to each end of each top closure panel which include tab elements located at the outer ends thereof, the improvement wherein each of the corner connecting flaps and corner reinforcing flaps at each corner of the tray are spaced from one another along a majority of their adjacent edges by a slot and are temporarily connected to one another at their ends via integral connector elements when the tray is assembled, said flaps at each corner of the tray being separated from one another and folded adjacent to one aother to provide reinforced corners after the tray is filled, said tab elements engage slots provided thereof in the bottom panel when the reinforcing flaps and top panels are folded into their respective final positions at each corner, said integral locking tabs engage the edges of said corner reinforcing flaps adjacent to their tab elements for retaining the corner reinforcing flaps in place at each corner, and said end

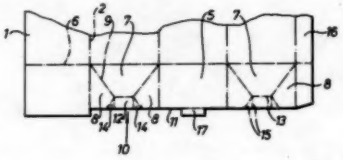
walls each include openings located adjacent to the corner connecting flap locking tabs which permit access to and manipulation of the locking tabs from outside the tray to urge the locking tabs into engagement with the edges of the corner reinforcing flaps.

4,702,410

BOTTOM DESIGN OF PACKING CONTAINERS

Jackie Derving, Malmö, Sweden, assignor to Tetra Pak International AB, Lund, Sweden

Filed Apr. 4, 1986, Ser. No. 848,131
Claims priority, application Sweden, Apr. 9, 1985, 8501720
Int. Cl.[4] B65D *5/06*
U.S. Cl. 229—184 **13 Claims**



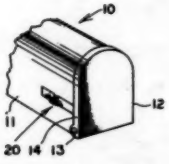
1. A container bottom for packing container blanks of the type comprising a number of top, bottom, and side panels separated by crease lines, said bottom comprising two main bottom panels, two fo!d-in bottom panels each having a first edge remote from said side panels and four fold-back panels each having a free edge, said fold-back panels joining together the main bottom panels and the fold-in bottom panels, said fold-back panels and said fold-in bottom panels having a number of edge panels which are divided from the fold-in bottom panels and the fold-back panels by means of crease lines which make possible a folding of the edge panels in relation to adjoining panels, said edge panels include primary panels and secondary panels serving as secondary fold-back panels, said secondary panels being situated on opposite sides of each of said primary panels.

4,702,411

SIGNALING APPARATUS FOR MAILBOXES

James R. Yager, 31055 Lincoln Rd., Westlake, Ohio 44145

Filed Sep. 2, 1986, Ser. No. 902,792
Int. Cl.[4] B65D *91/00*
U.S. Cl. 232—35 **6 Claims**



1. A signaling apparatus for use with a mailbox having a housing and a door movable between open and closed positions, comprising:

(A) a mounting member attachable to the exterior of the housing and including a first elongate plate having first and second ends and attachment means carried by said first elongate plate;

(B) a signaling member including a second elongate plate having first and second elongate plate having first and second ends; said second end of said first elongate plate being hingedly engaged by and normally in juxtaposition in the same plane as said first end of said second elongate plate;

(C) spring means interconnecting said mounting member and said signaling member;

(D) said signaling member being normally retained in non-signaling condition by the door against the force of said spring means and being movable to signaling position by said spring means upon opening of the door; and

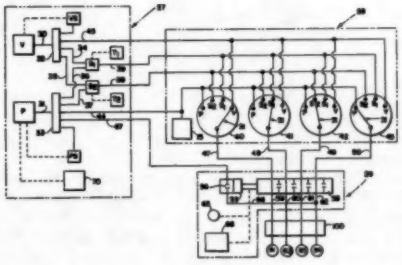
(E) said signaling position being approximately perpendicular to the plane of the housing to which said mounting member is attached.

4,702,412

ZONE CONTROL APPARATUS FOR CENTRAL HEATING AND/OR COOLING SYSTEMS

Alex Zelczer, and Ruth Zelczer, both of 3840 Severn Rd., Cleveland Heights, Ohio 44118

Continuation of Ser. No. 896,941, Aug. 15, 1986, abandoned.
This application Feb. 24, 1987, Ser. No. 17,849
Int. Cl.[4] G05D *23/00*
U.S. Cl. 236—46 R **13 Claims**



13. In combination with a central heating and/or cooling system having a source of conditioned fluid controlled by a thermostat in one energizing circuit for the source of conditioned fluid and respective conduits for directing the conditioned fluid to respective zones for conditioning the environment thereof, a zone control apparatus comprising: a pressure source, a vacuum source, a pressure supply line connected to said pressure source, a vacuum supply line connected to said vacuum source, a cycle period supply line, cycle controller means for automatically alternately connecting said pressure source and vacuum source to said cycle period supply line at prescribed times, at least one fluidically actuated flow control means for controlling flow of conditioned fluid through a respective one of said conduits, said flow control means having inlet means for receiving pressure and vacuum for actuation alternately between high and low flow conditions, and selector switch means for selectively connecting said inlet means of said flow control means to any one of said pressure supply line, vacuum supply line, and cycle period supply line.

4,702,413

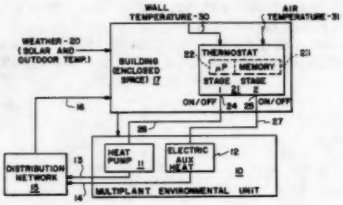
TEMPERATURE CONTROL SYSTEM USING A SINGLE RAMP RATE CURVE FOR CONTROL OF A MULTIPLANT ENVIRONMENTAL UNIT

Thomas J. Beckey, Edina; Kerry M. Kallas, Minneapolis, and Daniel T. Uhrich, Mayer, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 7, 1987, Ser. No. 46,766
Int. Cl.[4] F25B *29/00*
U.S. Cl. 236—46 R **10 Claims**

1. A temperature control system for control of a multiplant environmental unit for tempering the atmosphere in an enclosed space in an energy efficient manner, including: a multiplant environmental unit having at least a first output and a second output; said first output being more cost effective to

operate than said second output; real time clock operated two stage thermostat means located in said space; said thermostat means including means to enter selected times and temperatures, and further including means to sense an ambient temperature in said space; said thermostat means having a selected comfort setpoint temperature, and further having a selected energy savings setback setpoint temperature to define limits of the operation of said multiplant environmental unit over a temperature control cycle; said thermostat means including microcomputer means having memory means; said memory means storing a time versus temperature curve with said curve selected to utilize said first output, or both outputs simultaneously which causes said atmosphere to change from said energy savings setback setpoint temperature to said comfort



setpoint temperature; a first stage of said thermostat means operating said multiplant environmental unit upon said sensor temperature intersecting said operating curve which then locks on said first output; a second stage of said thermostat means operating said second output; said thermostat means ending a recovery and shifting to said selected comfort setpoint temperature upon said sensor temperature reaching a specified value below said setpoint temperature, or upon the expiration of a setback time programmed in said memory means; and said memory means storing a time of said ending recovery and increasing or decreasing a ramprate of said time versus temperature curve for a next temperature control cycle depending on whether said end of recovery time occurred before said setback time.

4,702,414

UTRASONIC INJECTING METHOD AND INJECTION NOZZLE

Hideo Hirabayashi, Chiba; Masami Endo, and Kakuro Kokubo, both of Kanagawa, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 15, 1985, Ser. No. 723,243

Claims priority, application Japan, Apr. 19, 1984, 59-77572

Int. Cl.[4] B05B *1/08, 17/04*

U.S. Cl. 239—4 **6 Claims**

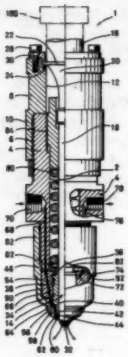
2. An ultrasonic injecting method of atomizing a liquid material by vibrating a vibrating element by means for generating ultrasonic vibrations which is operably connected to said vibrating element at one end thereof, characterized by:

(a) providing a multi-stepped edged portion having at least two steps at the other end of said vibrating element;

(b) feeding a liquid material to the edge of the first step of the multi-stepped edged portion;

(c) partially severing and atomizing the liquid material at the first step;

(d) feeding the excess portion of the liquid material which is not severed and atomized at the first step to the edge of the second step of the multi-stepped edge portion; and



(e) severing and atomizing the excess portion of the liquid material at the second step.

4,702,415

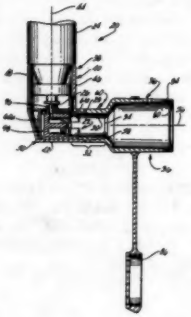
AEROSOL PRODUCING DEVICE

Nathaniel Hughes, Palm Springs, Calif., assignor to Vortran Corporation, Culver City, Calif.

Continuation-in-part of Ser. No. 555,703, Nov. 28, 1983, Pat. No. 4,635,857. This application Sep. 18, 1984, Ser. No. 652,740

Int. Cl.[4] A61M *11/06*

U.S. Cl. 239—8 **2 Claims**



1. A process for creating an aerosol characterized by the steps of:

providing a propellant to an inlet of a transducer;

impacting the propellant on a bluff body to create at least one vortex;

feeding the at least one vortex to an aperture spaced apart from the bluff body;

producing a vortex through an orifice spaced apart from the bluff body and separated from the bluff body by a wall preventing flow of fluid along the bluff body to the orifice; and

incorporating an active ingredient into the propellant.

2. A transducer for creating an aerosol having an inlet and an outlet portions, the transducer characterized by:

a single inlet tube having a first central axis;

a transducer body having a second central axis and to which the tube is coupled and wherein the first central axis is normal to a plane containing the second central axis;

a bluff body extending from one end of the transducer body

substantially to another end along the second central axis and comprising a groove in an end adjacent the other end of the transducer body extending from an interior surface portion of the bluff body to the end thereof; and

a cylindrical lens portion adapted to be positioned substantially within the other end of the transducer body and about the end of the bluff body, the lens portion comprising:

a first cylindrical aperture comprising an upstream portion and extending from an upstream portion of the lens portion to a downstream portion through the center of the lens portion for fitting the lens portion about the bluff body,

a first conically-shaped depression in the upstream portion converging downstream-wise to the upstream portion of the aperture,

a second conically-shaped depression in the downstream portion of the lens portion diverging downstream-wise from the dowstream portion of the aperture,

a second cylindrical aperture extending from the first depression toward the second depression, and

a third cylindrical aperture extending from the second cylindrical aperture to the first cylindrical aperture.

4,702,416

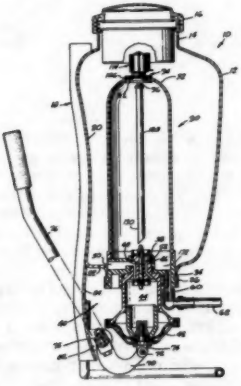
AGITATOR REGULATOR VALVE

Ferro D. Pagliai, 1300 Mairette Rd., Pacific Palisades, Calif. 90272, and Pedro W. Luchsinger, Kilometer 445 of the Panamericana Rd., Lagos de Moreno, Mexico 047400

Filed Oct. 28, 1985, Ser. No. 791,778

Int. Cl.[4] B05B *9/04, 9/08*

U.S. Cl. 239—11 **8 Claims**



5. A pressure regulator vessel for use within a liquid container of a sprayer of wettable powders, said container being connected to a pump for flowing liquid under pressure into said pressure regulator vessel from said container, said pressure regulator vessel comprising

a vessel body,

a pressure regulator valve mounted in an upper portion of said vessel body, and a suction tube connected to said pressure regulator valve at one end thereof and having the other end thereof positioned at a lower portion of said pressure vessel body, whereby pressure within said vessel exceeding a preset limit causes sediment and liquid to be drawn from the bottom of said pressure vessel for discharge through said pressure regulating valve and recirculation back into said container.

6. A method for recirculating and agitating the contents of a sprayer for dispensing liquids including suspensions of wettable powders of the type that tend to form precipitated sediment, the sprayer comprising a container for confining liquid to be sprayed, a pressure vessel within the container, and a pump for pumping liquid from the container into the pressure vessel to be discharged from the pressure vessel during a spraying operation, said pressure vessel being subject to accumulation of precipitated sediment at its bottom, said method being adapted to agitate the confined liquid by recirculation of sediment from the pressure vessel bottom to help maintain particles in suspension, said method comprising the steps of:

pressurizing the pressure vessel, and

releasing pressure in said pressure vessel through a pressure regulator valve, said step of releasing pressure comprising:

sucking said sediment and liquid from the bottom of said pressure vessel through a pressure regulator input conduit, and

discharging said sediment and liquid from said conduit through said pressure regulator valve and into said container

said container including an access opening at an upper portion thereof, said pressure vessel having an upper portion adjacent said access opening, and including the steps of mounting said pressure regulator valve to the upper portion of the pressure vessel adjacent the access opening to facilitate adjustment of the pressure regulator valve, said step of discharging comprising discharging said sediment and liquid from output passages of the pressure regulator valve at the upper portion of the interior of said container and above the top of the pressure vessel.

4,702,417

WATER SPRINKLERS FOR IRRIGATION SYSTEMS

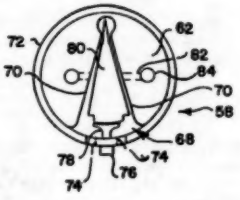
Quentin J. S. Hartley, 46 Simontown Road, Fish Hoek, Cape Province, and Daniel G. Christen, Cape Town, both of South Africa, assignors to Quentin John Seaton Hartley, South Africa

Filed Jan. 21, 1986, Ser. No. 821,019

Claims priority, application South Africa, Jan. 21, 1985, 85/0468; Aug. 7, 1985, 85/5968

Int. Cl.[4] B05B *3/00, 3/16, 3/06*

U.S. Cl. 239—98 **8 Claims**



2. A water sprinkler which includes a sprinkler head and a sprinkler body, there being first and second spray nozzles mounted on the sprinkler head which itself is mounted on the sprinkler body for oscillatory motion with respect thereto, the nozzles being so directed that water spraying from one nozzle rotates said sprinkler head in one direction with respect to said sprinkler body, and water spraying from the other nozzle rotates said sprinkler head in the other direction with respect to the sprinkler body, the water sprinkler further including means for directing water alternately to said first and second spray nozzles, the water directing means comprising a chamber, two water inlets to and two water outlets from said chamber, each outlet being connected to a respective one of said spray nozzles, a movable valve element in said chamber which element divides said chamber into two sub-chambers and which moves in said chamber in respect to water pressure variations in said sub-chambers, one of said inlets and one of said outlets communicating with each sub-chamber, said valve element having two end positions in which it closes-off one or

the other of said outlets, and means for obstructing water flow through each of said inlets in turn to cause cyclical water pressure variations in said sub-chambers.

4,702,418

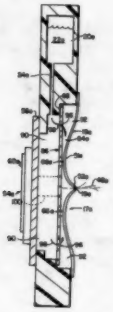
AEROSOL DISPENSER

Robert E. Carter, Auburndale, and Donald R. Murphy, Wellesley, both of Mass., assignors to Piezo Electric Products, Inc., Cambridge, Mass.

Filed Sep. 9, 1985, Ser. No. 773,677

Int. Cl.[4] B05B *3/14*

U.S. Cl. 239—101 **50 Claims**



33. An aerosol dispenser comprising:

a nozzle chamber for holding a fluid to be dispensed and a diaphragm forming at least a portion of said chamber and having an aerosol dispensing nozzle disposed therein, said chamber including a nozzle region proximate said nozzle and a larger reservoir region interconnected to said nozzle region;

backflow restrictive means for introducing fluid from said reservoir region to said nozzle region and restricting backflow from said nozzle region to said reservoir region, said backflow restrictive means formed in part by said diaphragm; and

means for driving fluid from said reservoir region to said nozzle region and from said nozzle region through said nozzle to create an aerosol spray.

4,702,419

DIAPHRAGM PUMP

Pedro W. Luchsinger, Kilometer 445 of the Panamericana Road, Laqos de Moreno 0047400, Jalisco, Mexico

Continuation of Ser. No. 616,212, May 31, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 849,213

Claims priority, application Mexico, Jun. 6, 1983, 197539

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] B05B *9/043*

U.S. Cl. 239—333 **3 Claims**

1. A diaphragm pump comprising

a pump housing having a cylindrical housing section and a chamber portion having an outwardly extending peripheral flange,

a cover housing section having an outwardly extending peripheral flange,

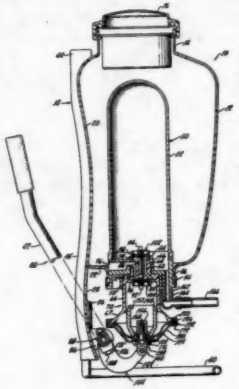
a stiff but resilient diaphragm having a peripheral edge captured between and sealed to said flanges, said diaphragm being substantially bell shaped, having an annular edge section including said peripheral edge lying in a central plane extending between flanges of said housing sections, having a substantially flat central section lying in a plane displaced from said central plane, said diaphragm including a dome shaped intermediate section integral with said central and annular edge sections and extending therebetween, said central section being movable between first and second diaphragm positions spaced from one another on opposite sides of said central plane by a distance that is a major fraction of the radius of said diaphragm, said stiff but resilient diaphragm providing an over-the-center snap type action that tends to return the diaphragm to and to hold it in said first position,

input and output passage means for flowing liquid into and out of the interior of said pump chamber portion,

valve means for selectively blocking and unblocking said passage means,

an actuating lever pivotally mounted for motion about an axis fixedly related to said pump housing,

means for pivotally connecting said lever to said diaphragm, whereby said diaphragm tends to be driven in a nonlinear path, and



means for restraining non-linearity of motion of the diaphragm, said pump housing including an integral coaxial connecting section at an end thereof remote from said actuating lever, said connection section comprising an externally threaded valve section extending axially of said pump housing and projecting from said cylindrical housing section, passage means comprising an input conduit having a first leg extending longitudinally of said valve section from said cylindrical housing, and having a second leg extending laterally from said first leg through the side of said valve section, and an output conduit extending longitudinally through said valve section from said chamber portion, said valve means comprising a valve pin extending through said valve section and having first and second extension shafts extending from opposite ends thereof, and first and second valve discs mounted on said first and second extension shafts, respectively, for controlling flow through said in put and output conduits.

4,702,420

SPRAY GUN FOR COATING MATERIAL

Anton Rath, deceased, late of Torkelhalden, Fed. Rep. of Germany (by Margaret Rath, heir), assignor to Ransburg-Gema AG, Switzerland

Filed Jan. 24, 1986, Ser. No. 822,480

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1985, 3503384

Int. Cl.[4] B05B *7/00*

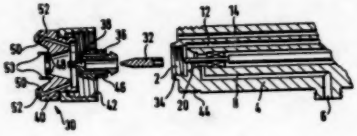
U.S. Cl. 239—391 **14 Claims**

1. A spray gun for dispensing coating material, comprising:

a gun body having a housing which defines a first group of channels which include at least one material channel for passage therethrough of coating material and at least one

gas channel for atomization gas, the housing having a nozzle connection end;

a detachable plurality of nozzle attachment sets each connectable to the connection end of the housing, each nozzle attachment set having a respective housing which defines



a second group of channels which include at least one material channel, the channels in the gun body housing being arranged to align with the channels in the detachable nozzle set; and

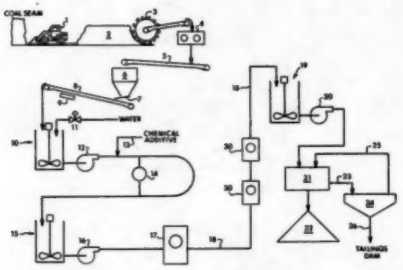
means for securing a selected nozzle of the nozzle set to the gun body.

4,702,421

PROCESS FOR CONVEYING RAW COAL

Paul D. Wruck, and Adrian J. Ryan, both of Queensland, Australia, assignors to Marathon Oil Company, Findlay, Ohio

Filed May 19, 1986, Ser. No. 865,227
Int. Cl.[4] B02C *23/18;* C10L *1/32*
U.S. Cl. 241—15 **26 Claims**



1. A process for conveying an unwashed raw coal containing a high ash content material via a pipeline having an inlet and an outlet comprising the steps of:

(a) crushing said raw coal to a coarse size distribution having a top size of at least about 10 mm;

(b) admixing said raw coal and water in a proportion sufficient to form a stable slurry having preselected rheological properties wherein said slurry consists essentially of said coal and a vehicle made up of water and a portion of said high ash content material dissociated from said coal during steps (a), (b), and a step of flowing said slurry via said pipeline;

(c) flowing said slurry from said pipeline inlet to said pipeline outlet at a remote location via said pipeline under turbulent conditions to dissociate said portion of said high ash content material from said coal into said vehicle which enhances said preselected rheological properties of said slurry and substantially reduces the amount of high ash content material contained in said coal at said pipeline outlet relative to said pipeline inlet; and

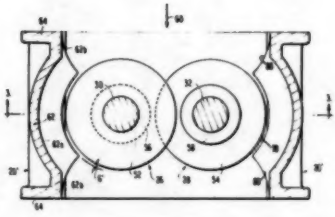
(d) separating said coal containing said substantially reduced amount of high ash content material from said vehicle at said remote location.

4,702,422

SOLID WASTE COMMINUTOR WITH SLOTTED SLIDE RAILS AND SIDE RAILS FOR SAME

Joseph W. Chambers, Sr., and Jerry R. Nona, both of Santa Ana, Calif., assignors to Disposable Waste Systems, Inc., Santa Ana, Calif.

Filed Sep. 19, 1986, Ser. No. 909,394
Int. Cl.[4] B02C *23/36*
U.S. Cl. 241—46.06 **14 Claims**



1. In an apparatus for comminuting solid waste material comprising:

a casing defining a comminution chamber and being open on opposite sides thereof for permitting the flow of liquid therethrough bearing solid waste material and being adapted for connection in a solid waste disposal line;

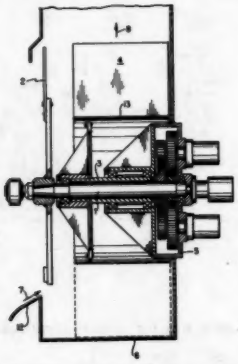
said casing including an underlying base and an overlying head; a comminutor assembly including cooperating substantially parallel first and second shredding stacks comprising: first and second parallel shafts mounted for rotation at opposite ends within said base and said head respectively; a plurality of concentric laminar cutting elements mounted on said first shaft in interspaced relationship with a plurality of second laminar cutting elements mounted concentrically on said second shaft, each of said cutting elements having at least one cutting tooth thereon, said cutting elements being positioned between and separated in an axial direction by laminar spacers which are coplanar with the cutting elements of the adjacent stack such that a cutting element from one stack and a spacer from the other stack form a pair of interactive shredding members, and wherein said casing includes laterally opposed side rails extending between the base and said head to the outside of respective stacks for controlling the flow of liquid through the comminution chamber from one side to the other and for causing the solid waste to be deflected into the path of rotating cutting elements of said stacks;

the improvement wherein each of said side rails comprises; a rear wall extending parallel to the flow direction of the liquid through the comminution chamber, a plurality of planar fingers projecting outwardly of said rear wall in the direction of said stack, aligned with the flow direction of the liquid and being spaced from each other to form slots therebetween, said fingers having arcuate, concave front edges remote from the rear wall in proximity to the periphery of the rotating cutting elements of the stack proximate thereto and being spaced slightly therefrom so as to define liquid flow passages between the fingers, and wherein the fingers are closely spaced such that the flow passages therebetween prevent unsheared solid waste material from passing therethrough with the liquid, but permit fine particles of solid waste material after shredding to be carried in the entrained liquid for passage therethrough, whereby the flow rate of liquid through the apparatus and the comminution efficiency of the apparatus is substantially enhanced.

4,702,423
CHOPPER HARVESTERS FOR SUGAR CANE AND SIMILAR PRODUCTS

Luiz A. Cerveira de Mello Ribeiro Pinto, Ribeirao Preto - SP, Brazil, assignor to Santal Equipmentos S.A., Brazil

Filed Nov. 4, 1985, Ser. No. 794,649
Int. Cl.[4] B02C 18/22
U.S. Cl. 241—60 11 Claims



1. A sugar cane harvesting machine of the type for cutting sugar cane into billets, and throwing the billets from a cutting assembly through a static delivery duct having an outlet for ejecting the billets therefrom, wherein the improvement comprises:

a cylindrical housing including inlet means for receiving sugar cane to be cut into billets, and an outlet means for ejecting said billets therefrom;

chopper-thrower means including:

a first axle centrally mounted within said housing along the central axis thereof;

cutting blade means rigidly mounted at one end of said first axle, the latter being rotational for rotating said cutting blade means past said inlet means for cutting said sugar cane as it enters said housing through said inlet means;

a second axle mounted over and wholly concentric with said first axle, said first and second axles being independently rotatable;

vane means rigidly mounted upon said second axle for rotation therewith for throwing said billets through said outlet means.

4,702,424
DEVICE FOR CHIPPING WOOD-LIKE MATERIAL

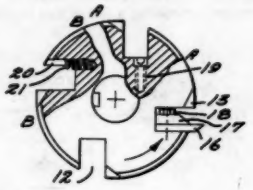
Marinus C. M. Widlak, Knegsel, Netherlands, assignor to Autobedrijf de Beemd, Eindhoven, Netherlands

Continuation of Ser. No. 645,090, Aug. 28, 1984, abandoned.
This application Mar. 17, 1987, Ser. No. 27,063
Claims priority, application Netherlands, Sep. 7, 1983, 8303099
Int. Cl.[4] B27C 1/00; A01D 55/00
U.S. Cl. 241—101.7 10 Claims

1. A device for chipping wood chiefly in the form of branches comprising: a housing, an elongated cylinder rotatable in a selected direction about its longitudinal axis, a longitudinally extending knife disposed on said cylinder and a counter-knife mounted on said housing adjacent said cylinder and extending parallel to the longitudinal axis of said cylinder;

said cylinder having a peripheral surface, said surface having a plurality of circumferentially extending grooves thereon with said grooves being spaced along said longitudinal axis of said cylinder;

said cylinder having a slot means formed therein and extending parallel to said longitudinal axis, said slot means being located, with respect to said direction of rotation, in advance of said knife for temporarily collecting and conducting away the chipped wood, said knife having a portion thereof disposed in said slot;

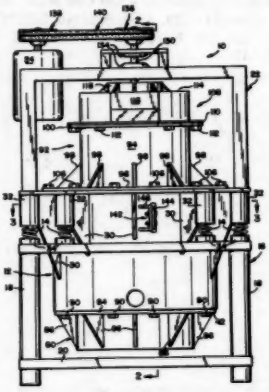


said slot having, with respect to said direction of rotation, a bevelled leading edge, said leading edge having, adjacent said peripheral surface of said cylinder, at least two nose-like projections for breaking up pieces of wood, said projections being spaced apart along said longitudinal axis of said cylinder.

4,702,425
VIBRATORY CRUSHING APPARATUS

David P. McConnell, Jr., 9333 East Apache Trail, Suite 21, Box 149 Mesa, Ariz, 85207

Filed Jan. 28, 1986, Ser. No. 823,310
Int. Cl.[4] B02C 2/04
U.S. Cl. 241—156 20 Claims



1. A crusher comprising

a supporting frame structure, upper and lower reaction collar members mounted upon the frame structure,

an elongated mandrel having a shaft extending along an axis of the mandrel and supported for rotation relative to the mandrel by bearing means, eccentric masses being mounted in opposed offset relation to each other on opposite ends of the shaft,

support means providing floating support for the mandrel with end portions of the mandrel being respectively arranged within the first and second reaction collar members,

means for driving the shaft in rotation whereby the eccentric masses on the shaft cause the end portions of the mandrel to gyrate relative to the reaction collar members for producing an oscillatory vibrating crushing effect therebetween, and

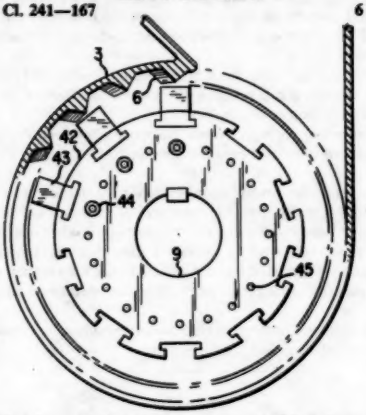
hinge means respectively coupling the eccentric masses to the shaft whereby the eccentric masses can freely respond to centrifugal forces while not resisting constantly changing inclination of the shaft during operation of the crusher.

4,702,426

SCREENLESS SCREW MILL

Paolo Citterio, Milan, Italy, assignor to Maistore S.p.A., Bergamo, Italy

Continuation of Ser. No. 582,544, Feb. 22, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 848,858
Claims priority, application Italy, Mar. 21, 1983, 20176 A/83
Int. Cl.[4] B02C 13/28
U.S. Cl. 241—167 6 Claims



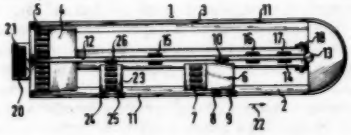
1. A screenless mill for grinding material comprising a hollow cylinder, end walls on said cylinder to close the same except for a feed port and a discharge port, a shaft mounted for rotation centrally within said hollow cylinder, a plurality of fixing discs carried by said shaft so as to be rotated thereby, and grinding elements rigidly secured to the peripheries of said fixing discs in a plurality of circumferentially arranged recesses, said grinding elements and said discs being mounted on said shaft with the grinding elements arranged in a helical pattern thus forming a screw, said grinding elements cooperating with said hollow cylinder so as to grind material therebetween upon rotation of said shaft, whereby simultaneously with the grinding between the grinding elements and said cylinder the material is caused to advance from the feed port to the discharge port, and wherein the grinding elements are arranged on carrying bars in groups with rectilinear alignment, each group forming an integral single piece with the carrying bar, the base part of the carrying bars being of a configuration suitable to enable them to be axially inserted into said circumferentially arranged recesses on said fixing discs, said recesses being of a configuration corresponding to the base part of the carrying bars, and said bars being parallel to the rotating shaft.

4,702,427

COIL PRODUCING MACHINE

Hans Raasch, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany

Continuation of Ser. No. 830,249, Feb. 18, 1986, abandoned. This application Oct. 6, 1986, Ser. No. 915,866
Int. Cl.[4] B65H 54/26, 9/18
U.S. Cl. 242—35.5 A 6 Claims



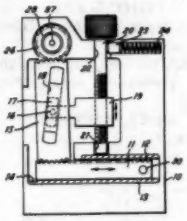
1. Coil producing machine with a mobile exchanging device for replacing fully wound coils with empty coil cores or partly wound coils, and with a stationary loading magazine for replenishing the empty coil cores or partly wound coils required by the exchanging device, comprising a mobile coil-core carrier, means for automatically shuttling said carrier between the exchanging device and the loading magazine, a pair of mutually spaced rails, and a plurality of coil winding devices disposed along and below said pair of rails, the mobile exchanging device and said mobil coil-core carrier being mounted in common on said pair of rails for travelling thereon, both said mobile coil-core carrier and the mobile exchanging device have respective magazines for coil cores, said magazine of said mobile coil core carrier being selectively displaceable into a position adjacent the stationary loading magazine for accepting coil cores therefrom and into a position adjacent the mobile exchanging device for delivering the coil cores thereto, and said magazine of the mobile exchanging device being selectively engageable with said mobile coil core carrier for receiving coil cores therefrom, and displaceable into a position adjacent the coil winding devices, respectively, for delivering the coil cores thereto.

4,702,428

INFINITELY VARIABLE RATIO DRIVE MECHANISM

Roger B. Kempster, Brookmans Park, England, assignor to Allen Coding Machines Limited, Hertfordshire, England

Filed Jun. 26, 1986, Ser. No. 878,829
Claims priority, application United Kingdom, Jun. 28, 1985, 8516400
Int. Cl.[4] B65H 20/04; F16H 29/20, 35/08
U.S. Cl. 242—67.2 8 Claims



1. A variable ratio drive mechanism comprising
(a) a housing,
(b) an input member in said housing, including a toothed rack,
(c) an output gear rotatably mounted in the housing,
(d) an intermediate pivoted gear which is truncated to form a bar having a gear segment at each end, one gear segment meshing with said toothed rack and the other gear segment meshing with said output gear and effecting a driving connection between said input member and said output gear, and
(e) adjustable means for selectively positioning the pivotal axis of said intermediate gear whereby the distance between the pivotal axis of said intermediate gear and the point of meshing engagement of said intermediate gear and said output gear can be infinitely varied.

4,702,429

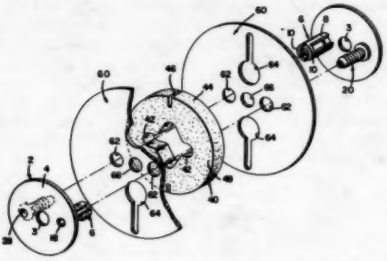
EXPANDABLE REEL ASSEMBLY

Allen C. Black, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 10, 1986, Ser. No. 884,324
Int. Cl.[4] B65H 75/14; A41F 1/04
U.S. Cl. 242—71.8 11 Claims

1. A reel assembly comprising:
a circular core member having sidewalls, a circumferential surface, and a central passageway therethrough;
two flange members having a larger diameter than said core member, each flange member being positioned against a sidewall of said core member, and having at least two through holes aligned with said passageway; and
two like fastener members, each fastener member including

a disc having a male and female fastener member extending from the disc, the male and female members being equally spaced from and on a line through the center of the disc, each fastener member being positioned against



different of said flange members, and each having locking means associated with the male and female members, extendable into said through holes and passageway, for locking said flanges and core together.

4,702,430

ADJUSTABLE FORCE DRAG BRAKE DEVICE FOR A FISHING REEL

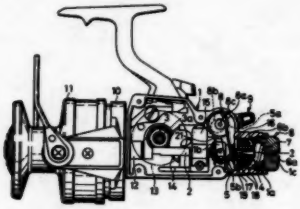
Masaji Saito, Tokyo, Japan, assignor to Daiwa Seiko Co, Ltd., Tokyo, Japan

Filed Jul. 19, 1985, Ser. No. 756,609

Claims priority, application Japan, Jul. 20, 1984, 59-109839[U]

Int. Cl.[4] A01K *89/02*

U.S. Cl. 242—84.5 A **3 Claims**



1. A drag brake device for a fishing spinning reel which has a spool which can hold fishing line comprising:

a cylinder, provided at the rear end of a reel casing, said cylinder having a groove formed in the inner wall thereof in such a manner that said groove is extended along an axial direction of said cylinder;

a spool shaft, having one end portion adapted to be coupled to a spool and the other end portion extended into said cylinder from the side of said reel casing, the other end portion being a segmental shaft;

a segmental cylindrical shaft supported on said casing and having a hold engaged with said segmental shaft, so that said segmental shaft is slidable in the axial direction and rotatable together with said cylindrical shaft;

a first brake member mounted on said segmental cylindrical shaft in said cylinder in such a manner that said first brake member has a peripheral portion engaged with said groove formed in said inner wall of said cylinder and allows said segmental cylindrical shaft to rotate;

a second brake member mounted on said segmental cylindrical shaft in such a manner that said second brake member is rotatable with respect to said groove formed in said inner wall of said cylinder but not rotatable with respect to said segmental cylindrical shaft;

a friction board interposed between said first and second brake members;

a brake board having a protrusion extended from a peripheral portion thereof which is confronted with said casing in which said brake. members are stacked, said protrusion being engaged with said groove formed in said inner wall of said cylinder so that said brake board is movable in the axial direction with respect to said segmental cylindrical shaft;

an adjusting cylinder, threadably engaged with said cylinder, in such a manner that the movement thereof in the axial direction is adjustable;

a rear pressing spring member interposed between the rear surface of said first brake member and said adjusting cylinder;

a front pressing spring member having a middle portion abutted against the front surface of said second brake member, and having one end supported on said casing and the other end abutted against a cam member which is rotatably supported by said casing in such a manner that the position of said front pressing spring member is adjustable; and

a drag adjusting lever provided on the outside of said casing and coupled to said cam member.

4,702,431

DRAG FORCE MEASURING DEVICE FOR SPINNING REELS

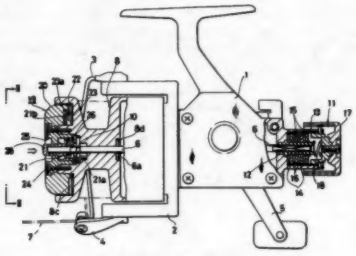
Kyoichi Kaneko, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Filed Aug. 28, 1986, Ser. No. 901,807

Claims priority, application Japan, Aug. 30, 1985, 60-191777; Nov. 25, 1985, 60-264121; Jul. 25, 1986, 61-174909; Jul. 30, 1986, 61-179034

Int. Cl.[4] H01K *89/01;* **G01L** *3/14*

U.S. Cl. 242—84.5 A **13 Claims**



1. In a spinning reel having a bailed rotor rotably mounted on a reel body, a spool pin rotatably, and axially slidably, mounted on said reel body, a spool carried on said spool pin for rotation therewith and being adapted for windingly receiving thereabout a fishing line responsive to rotation of said spool, a drag mechanism mounted on said reel body, and means operatively interconnecting said drag mechanism and said spool pin for applying a drag force to said spool, the improvement comprising a drag force measuring device comprising a measuring operation member for rotating said spool, a measuring spring member connecting said operation member and said spool whereby upon rotation of said operation member said spring is stressed to establish a torque corresponding to the drag force set by said drag mechanism, and indicating means for indicating in terms of the applied drag force the amount of relative rotation between said operation member and said spool before the same are jointly rotatable.

4,702,432

SPINNING REEL BRAKE FOR FISHING

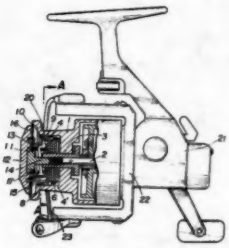
Kyoichi Kaneko, and Nobuyuki Yamaguchi, both of Tokyo, Japan, assignors to Daiwa Seiko Inc., Tokyo, Japan

Filed Apr. 3, 1986, Ser. No. 847,713

Claims priority, application Japan, Apr. 19, 1985, 60-58760[U]

Int. Cl.[4] A01K *89/01, 89/02*

U.S. Cl. 242—84.5 A 6 Claims



1. A spinning reel for fishing comprising:

a rotor having a bail arm, and a handle in a reel housing connected to said rotor, for rotating the rotor by turning the handle to wind up a fishing line;

a spool having an axis for said winding of the fishing line, located in front of said rotor and having a recessed portion in a front side thereof;

a shaft connected to said spool along said axis of winding, to move said spool back and forth with respect to said rotor; and

a drag adjusting knob located in said front side of said spool for adjusting the drag for unwinding said fishing line from said spool; and

means for preventing said drag adjusting knob from loosening, comprising:

an end of said shaft being formed with a partly cut-away circular shape in cross section;

the spool being rotatably fitted onto said end of said shaft;

brake members for braking the spool being inserted in said recessed portion in said front side of the spool;

a dish member of said loosening preventing means having tongued and grooved face formed on an inner peripheral surface of said dish member, said dish member being engaged with the shaft, said shaft protruding frontwardly beyond the brake members, and said dish member being movable in the axial direction of said shaft;

said drag adjusting knob being screwed into the end of the shaft for motion in the axial direction thereof by rotation of the drag adjustment knob;

a cylinder of said loosening preventing means with a top and a bottom being secured at said top thereof by respective fastening means to a rear surface of said drag adjusting knob, said bottom of said cylinder being contacted to a bottom surface of said dish member, and a pair of through holes being formed in the sides of the cylinder in an opposing manner; and

an annular spring of said loosening preventing means being inserted in said cylinder with first ends fitted to one of said through holes, and a central folded protrusion of the annular spring protruding through the other through holes so as to come into engagement with the tongued and grooved face of said dish member to provide a holding force for said preventing of loosening of said drag adjustment knob.

4,702,433

COIL CARRIER

Hans N. Gilljam, Aachen; Manfred Chardon, Monchengladbach; Gregor Gebald, Korschenbroich-Pesch, and Heinz-Peter Illig, Ubach-Palenberg, all of Fed. Rep. of Germany, assignors to Joseph Zimmermann, Aachen, Del.X

Filed May 9, 1986, Ser. No. 862,601

Claims priority, application Fed. Rep. of Germany, May 10, 1985, 8514349[U]

Int. Cl.[4] B65H *75/18, 75/20, 75/24*

U.S. Cl. 242—118.1 19 Claims

1. A stackable coil carrier which can be matingly stacked with like coil carriers, said coil carrier including an essentially cage-like shell means having first and second ends and a generally cylindrical peripheral surface for receiving a wrapping of yarn or the like, a first end ring attached to the first end of said cage-like shell means and including a generally cylindrical covering section having an inner surface, a second end ring attached to the second end of said cage-like shell means and including an outer surface and an axially projecting collar, said axially projecting collar further including a circular thread reserve groove extending inwardly from the outer surface of said axially projecting collar and said axially projecting collar having an outer surface having a smaller diameter than the diameter of said inner surface of said cylindrical covering section so that said thread reserve always remains accessible when the collar is positioned within the confines of a cylindrical cover section of another of said coil carriers.

4,702,434

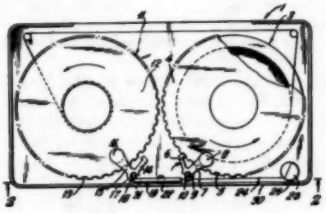
TAPE CASSETTE ARRANGEMENT

Roger Brauer, 30 Henry Ave., Palisades Park, N.J. 07650

Filed May 19, 1986, Ser. No. 864,427

Int. Cl.[4] G11B *15/32, 23/04*

U.S. Cl. 242—198 5 Claims



1. A single play tape cassette driven by a playing apparatus comprising:

a take up reel and a supply reel having a tape movable therebetween, each of said reels having toothed peripheral portions,

first mounting means, a first pivotly mounted pawl mechanism mounted thereto having a first pawl arm mounted for

engagement with the toothed peripheral portion of the take up reel and a first finger integral with the first pawl and located at an angle thereto and mounted in engagement with the take up reel, and second mounting means, a second pivotally mounted pawl mechanism mounted thereto having a second pawl arm mounted for engagement with the toothed peripheral portion of the supply reel, and a second finger integral with the second pawl and mounted in engagement with the supply reel, wherein the first pawl is actuated by the first finger to prevent rotation of the take up reel in a rewinding direction, and the second pawl is actuated by the second finger to prevent rotation of the supply reel in an unwinding direction,

control means mounted within the cassette to selectively disable the first or the second pawl mechanisms to allow rotation of the supply reel in the unwinding direction or to allow rotation of the take up reel in the rewinding direction, and

means to engage the control means to cause it to disable one of the pawl mechanisms.

4,702,435

FLIGHT CONTROL APPARATUS

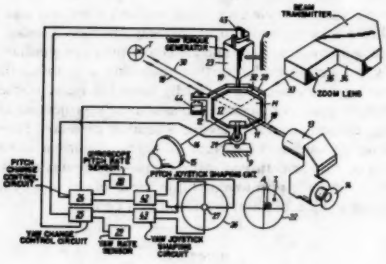
William J. Montgomery, Antrim, and Eric Nicholson, Bangor, both of Northern Ireland, assignors to Short Brothers PLC, Belfast, Northern Ireland

Filed Apr. 1, 1986, Ser. No. 846,737

Claims priority, application United Kingdom, Apr. 2, 1985, 8508641; Feb. 3, 1986, 8602605

Int. Cl.[4] F41G *7/26*

U.S. Cl. 244—3.13 **14 Claims**



1. A method for controlling the flight of an aerial vehicle to a target, comprising the steps of:

providing a field of view to an operator using viewing means provided in a primary optical path, and acquiring said target within said field of view by moving said viewing means;

generating a guidance beam for guiding said vehicle to said target;

stabilizing said beam with a beam stabilizing device by projecting said beam along a secondary optical path stabilized against predetermined movements of said viewing means;

actuating said beam stabilizing means with beam deflection means to vary an angular disposition of said beam in said secondary path with respect to said primary optical path;

injecting an aiming mark into said field of view with aiming mark injection means which are responsive to said actuation of said beam stabilizing means by said beam deflection means, a disposition of said aiming mark being representative of said angular disposition of said guidance beam with respect to said primary optical path; and

actuating said beam deflection means with operator-controlled means to bring said guidance beam onto said target by bringing said aiming mark onto said image of said target within said field of view.

4,702,436

PROJECTILE GUIDE MECHANISM

Anders Arnell, Eskilstuna, Sweden, assignor to Affarsverket FFV, Eskilstuna, Sweden

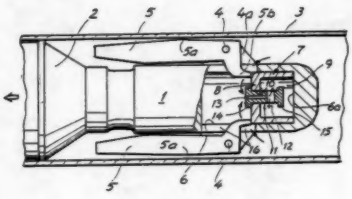
PCT No. PCT/SE85/00483, § 371 Date Jul. 24, 1986, § 102(e) Date Jul. 24, 1986, PCT Pub. No. WO86/03579, PCT Pub. Date Jun. 19, 1986

PCT Filed Nov. 25, 1985, Ser. No. 890,148

Claims priority, application Sweden, Dec. 13, 1984, 8406351

Int. Cl.[4] F42B *13/32*

U.S. Cl. 244—328 **6 Claims**



1. A guide mechanism for a projectile (2) which is intended to be fired from a barrel (3) with the aid of propellant gases, comprising a plurality of elongated fins (5) which are journalled at one end thereof and which are arranged to occupy a folded position during passage of the projectile through the barrel, and which fins are subjected to a fin-extending force with the aid of a piston (7) which is arranged for movement in a housing (6) in the guide mechanism while in dogging engagement with the fins, a valve (11) being mounted coaxially within the piston and slideably therein, the valve being operative as a result of initial setback forces on the projectile to open a channel means (10) in the valve, such that, during a pressure increase phase of the propellant gases in the barrel, said gases are passed through said channel means to a chamber (9) located on one side of the piston in order to build-up a piston working pressure in said chamber, the valve being operative in throttling the channel means as a result of a pressure reduction phase of the propellant gases.

4,702,437

ELECTRIC AIR-DRIVEN HELICOPTER

Hoyt A. Stearns, Jr., 4131 E. Cannon Dr., Phoenix, Ariz. 85028

Filed Feb. 7, 1985, Ser. No. 699,460

Int. Cl.[4] B64C *27/16*

U.S. Cl. 244—17.11 **11 Claims**

1. In a helicopter having a fuselage and at least one rotor blade having a hub end and a tip end and having a leading edge and a trailing edge, said blade mounted for free rotation on the fuselage, an improvement including in combination:

an electric motor mounted in said rotor blade:

power producing means located in the fuselage of said helicopter for providing electrical power;

means for supplying electrical power from said power producing means to said motor;

a cross-flow fan mounted for rotation in said rotor blade near the tip thereof and coupled to said motor to be rotated thereby;

means for supplying air through the leading edge side of said blade to said fan;

means for delivering air from said fan outwardly from the trailing edge side of said blde to provide the sole dynamic rotational thrust to said blade;

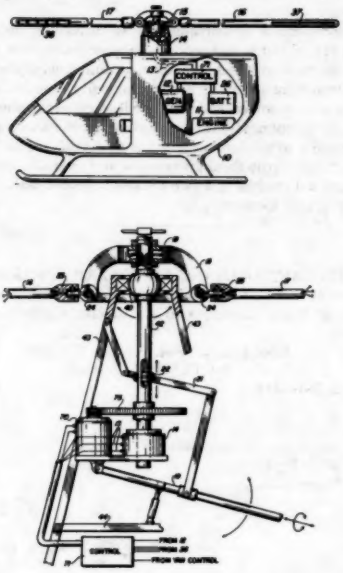
a support shaft having a central axis;

a hub interconnected with said support shaft, said rotor blade being coupled to said hub to rotate therewith;

means for attaching said support shaft to the fuselage of said helicopter to a bearing for free rotation therethrough; and

means connected to the fuselage of said helicopter for apply-

ing bi-directional relative rotational yaw control torque between said fuselage and the central axis of said support



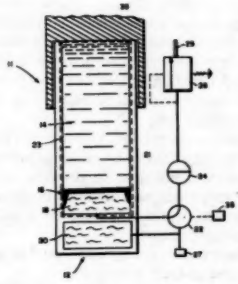
shaft to generate counteracting yaw rotational forces to the fuselage.

4,702,438

ADAPTIVE LANDING GEAR

Robert S. Levy, Huntington, and Thomas W. Kerr, Dix Hills, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 16, 1985, Ser. No. 755,394
Int. Cl.[4] B64C *25/60*
U.S. Cl. 244—104 FP **2 Claims**



1. In a landing gear for aircraft, said landing gear having a main shock absorbing strut and a wheel, the improvement therein being in the form of an adaptive landing gear assembly operably connected between said main shock absorbing strut and said wheel, said adaptive landing gear assembly comprising:

a housing, said housing having a first chamber and a second chamber therein;

a floating piston located within said first chamber, said floating piston defining together with said housing a lower chamber within said first chamber below said floating piston;

means for selectively coupling said lower chamber to said second chamber and to the atmosphere for selectively maintaining pressure within said lower chamber, said selective coupling means including a three-way, two position valve, a pressuring reducing valve, a vent and a shut-off valve interposed between said two-position valve and said pressure reducing valve; and

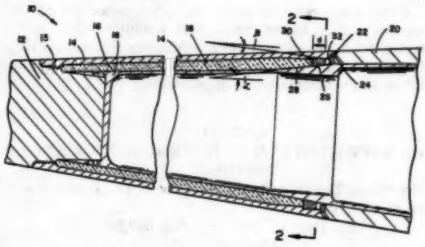
means for introducing a regulated amount of gas either into said second chamber for subsequent introduction into said lower chamber of said first chamber via said two positions valve or into the atmosphere via said two position valve, said shutoff valve, said pressure reducing valve and said vent in order to regulate the position of said wheel relative to said main shock absorbing strut.

4,702,439

SUPPORT FOR THERMALLY EXPANDING CONICAL HEATSHIELD

Anthony D. Kelley, Willow Glen; James W. Finley, Palo Alto; Vernon F. Eachus, San Jose; Richard A. Lim, Sunnyvale, and Miles K. Yano, Gardena, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 20, 1987, Ser. No. 5,971
Int. Cl.[4] B64G *1/58*
U.S. Cl. 244—158 A **25 Claims**



1. In a reentry body of the type having a nosetip of carbon-carbon composite material, a conical forward heatshield of carbon-carbon composite material having its forward end coupled to said nosetip, a conical aft heatshield of carbon-phenolic composite material having its forward end coupled to the aft end of the forward heatshield, and a metallic substructure disposed interior to said forward and aft heatshields, the improvement being means for coupling said forward heatshield to said aft heatshield which provides continuous support for said heatshields while allowing large axial and circumferential expansion of said forward heatshield, which comprises:

(a) said forward heatshield and said aft heatshield being disposed to provide a tolerance gap between said forward heatshield and said aft heatshield, said tolerance gap being sized to accomodate thermal expansion of the forward heatshield;

(b) a spacer washer of high temperature material disposed in said tolerance gap, said washer accomodating the thermal expansion of the forward heatshield; and

(c) a segmented ring of wedge blocks of pyrolytic graphite disposed between an inclined surface of said substructure and an inclined surface of the forward heatshield, the inclined surface of said substructure accomodating thermal expansion of said wedge blocks and movements of said wedge blocks due to thermal expansion of the forward heatshield, said segmented ring including gaps between the segments to allow for circumferential thermal expansion of the wedge blocks.

4,702,440

SATELLITE STATION

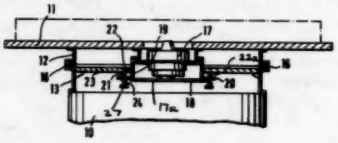
Hans-Juergen Guenther, Bremen; Ortwin Golbeck, Hude, and Joachim Nauck, Bremen, all of Fed. Rep. of Germany, assignors to Erno Raumfahrttechnik GmbH, Bremen, Fed. Rep. of Germany

Filed Oct. 14, 1986, Ser. No. 917,851

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1985, 3536577

Int. Cl.[4] B64G 1/22

U.S. Cl. 244—158 R 4 Claims



1. In a satellite or space station, which is comprised of at least one stabilized service module, and a payload module, to be connected to the service module so as to permit the two modules to be oriented differently in relation to each other, an interconnecting and coupling structure comprising:

latchable lift-and-turn mechanisms having some components in the service module and remaining components in the payload module, and constructed for rotatably interconnecting the two modules but being prior and during launching disconnected from each other, there being means for providing a lift such that the said components are interconnected to obtain the interconnection of the service module and of the payload module; and

a means for independently and releasably interconnecting latching and locking the two modules together while said lift-and-turn mechanism is disconnected.

4,702,441

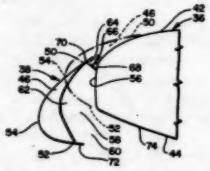
AIRCRAFT WING STALL CONTROL DEVICE AND METHOD

Timothy Wang, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 31, 1984, Ser. No. 687,599

Int. Cl.[4] B64C 21/08

U.S. Cl. 244—204 20 Claims



1. In a wing of an aircraft, where the wing comprises:

(a) a main wing structure having an upper aerodynamic surface, a lower aerodynamic surface, and a forward surface portion that extends upwardly toward said upper aerodynamic surface;

(b) a leading edge member which is moveable between a stowed position for cruise mode where the device aerodynamically conceals the surface of the main wing structure, and a deployed position for high-lift mode where the device forms with the forward surface portion of the main wing structure a slot for passage of air upwardly therethrough and over the wing upper surface;

(c) said wing being characterized in that within a predetermined range of high angles of attack and with the leading edge member deployed, there is an aerodynamic condition of initial stall at a first spanwise location of the wing, without a corresponding pattern of stall developing at a second spanwise location of the wing, with said aerodynamic condition producing an undesired pitching moment;

the improvement comprising a flow disturbing means positioned at said slot at said second spanwise location in a manner that with the leading edge member in said stowed position, the flow disturbing means is aerodynamically concealed by the leading edge member, and with the leading edge member in its deployed position, said flow disturbing means is exposed aerodynamically to antiflow in said slot to disturb the airflow that proceeds upwardly through said slot and over said wing, so as to create a disturbance which creates a desired stall condition at said second location.

4,702,442

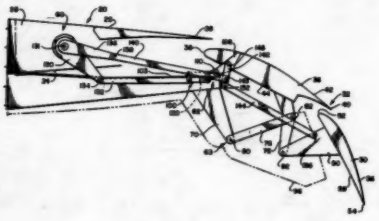
AIRCRAFT TRAILING EDGE FLAP APPARATUS

Richard H. Weiland, Seattle, and William L. Franklin, Bothell, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 6, 1984, Ser. No. 679,203

Int. Cl.[4] B64C 9/20

U.S. Cl. 244—216 27 Claims



1. A high lift apparatus for an airfoil, said airfoil having a forward portion and a rearward portion, said high lift apparatus comprising:

a. a flap assembly located proximate to the rear portion of said airfoil, said flap assembly including a first flap and a second flap, said second flap positioned generally rearwardly from said first flap;

b. means for supporting said flap assembly to permit movement of said first flap and said second flap between a first forward stowed position wherein said first flap and said second flap are generally aerodynamically aligned for a cruise mode of operation, a second intermediate position where the first and second flaps are displaced rearwardly from the first position, and a third high lift position wherein said first flap and said second flap are displaced rearwardly and downwardly relative to the chordwise axis of said airfoil; and

c. actuator means, operatively connected to an input drive shaft, for moving said flap assembly between said first, second and third positions in response to a drive input from said drive shaft, said actuator means including:

(1) a first arm operatively connected to said main flap by a first linkage means,

(2) a second arm operatively connected to said second flap by a second linkage means, and

(3) arm locating and drive means, for moving said first arm and said second arm simultaneously through a first predetermined path to cause said first linkage means and said second linkage means, respectively, to move said first flap and said second flap, respectively, between said first stowed position and said second intermediate position, said arm locating and drive means being arranged so that said input drive shaft moves said second arm in a manner independently of said first arm beyond said intermediate position through second path

segment to cause second linkage means to move said second flap further relative to said first flap, said arm locating and drive means including means for operatively connecting said first and second arms during movement through said first path segment and for disconnecting said first and second arms for movement of said second arm through said second path segment.

4,702,443

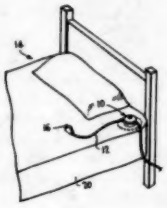
CORD HOLDING DEVICE

James J. Callaway, Moran Rd., Franklin, Tenn. 37064

Filed Aug. 8, 1986, Ser. No. 894,835

Int. Cl.[4] F16L *3/00*

U.S. Cl. 248—51 **11 Claims**



1. A cord holding device for retaining an electrical cord on a bed covering such as a bed sheet laid over an underlying bedding element such as a mattress cover, the cord holding device including three connectable disconnectable parts, a first of said parts comprising a base member having a base flange, attachment means for securing the flange substantially face-to-face on the bedding element under the bed covering, and first clamp means extending upwardly from the base flange, a second of said parts comprising a cord holder member including second clamp means for snapping onto the first clamp means over the bed covering and trapping the bed covering therebetween, and first peripheral wall means extending upwardly from the second clamp means, the first peripheral wall means defining spaced top-opening slots for receiving the electrical cord with the cord extending chord-wise across the cord holder member, the third of said parts comprising a cover member for snapping into engagement with the first wall means and retaining the cord in the slots.

4,702,444

SEALING SYSTEM

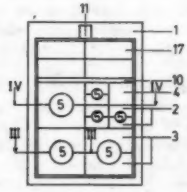
Johannes A. Beele, Ke Opmeer, Netherlands, assignor to Lycab AB, Karlskrona, Sweden

Filed Nov. 15, 1985, Ser. No. 798,754

Claims priority, application Netherlands, Nov. 30, 1984, 8403650

Int. Cl.[4] F16L *5/00*

U.S. Cl. 248—56 **9 Claims**



1. A sealing system for the sealing passage of a cable, tube and the like through a wall, comprising a rectangular frame of a stiff material that can be sealingly mounted in an aperture provided in the wall, the side faces of which frame contain flanges which are crosswise of its plane, also comprising one or more parallelepipedal blocks of a resilient material, which blocks in their composite shape feature a bore adapted with slight tolerances to the form and dimensions of the cable to be led through and which blocks can be positioned to a close fit into the aperture formed by the said flanges such that the halves are consistently fitted together so as to enclose a cable, while in addition compression means are present which are capable of compressing the blocks placed in the frame aperture in the plane of this aperture such that a sealing force is exercised between the halves of the blocks, between the outer surfaces of the blocks, between the wall of the bores and the outside of the cables which they contain and between the outer surfaces of the blocks and the insides of said flanges, while moreover retaining means are present which can, on the one hand, be supported by the said flanges and, on the other hand, retain the blocks in crosswise direction relative to the frame, wherein the half blocks feature at least one groove running transversely to the longitudinal axis of the bore on those outer surfaces which are parallel to the said axis, while the insides of at least one set of oppositely disposed flanges of the frame have a groove opposite which a groove of a half block is positioned and the retaining means consist of rod-shaped elements whose ends are supported in two mutually opposite grooves in the flanges vis-a-vis these flanges, whereas the central part of a rod-shaped element rests in and entirely fills a groove of a half block along its entire length, thereby locking this half block transversely relative to the plane of the frame.

4,702,445

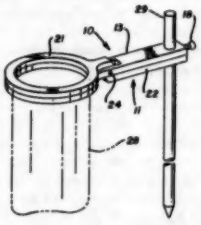
SELF ADJUSTING BAG SUPPORT

Brian K. Ivory, 815 Sunshine, Youngstown, Ohio 44505

Filed Feb. 12, 1987, Ser. No. 14,014

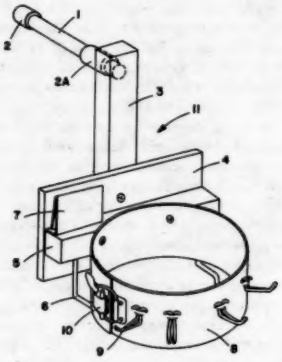
Int. Cl.[4] B65B *67/04*

U.S. Cl. 248—100 **1 Claim**



1. A bag supporting device comprising a pair of interengaging frame members, each frame member having a ring portion and a elongated handle portion of a length greater than that of said ring portion, a slot in the handle portion of one of said frame members adjacent said ring portion and an area of reduced transverse dimension on the handle portion of said other frame member, wherein said portion of the handle having an area of reduced transverse dimension is angularly offset in relation to the longitudinal axis of its handle portion and is engageable through said slot in the handle portion of one of said frame members, said frame member defined by said portion of the handle having an angularly offset area of reduced transverse dimension, has the remaining handle portion adjacent said angularly offset area parallel to one another, a pivot in said handle portion of said area of reduced transverse dimension of said handle portion, a plurality of spaced teeth extending from one of said ring portions registerably engaging in said annular slot extending completely around said other ring.

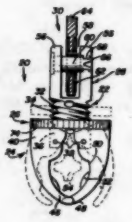
4,702,446
LADDER CADDY
Franklin C. Brown, 1607 Windchime Dr., Dallas, Tex. 75224
Filed Jan. 2, 1987, Ser. No. 39
Int. Cl.[4] E06C 7/14
U.S. Cl. 248—210 3 Claims



1. A ladder caddy for connecting, generally but not limited to, a pail of paint, stain or other such substance to a ladder having hollow rungs and utilizing the hollow portion of one of the rungs to position the pail out to the side of the ladder and comprised of: a holding arm that enters a hollow rung from either side of the ladder and equipped with two short rubber friction sleeves that surround the holding arm at each extreme end of its exposed surface; a support arm into which is anchored at its top end and at 90 degrees one end of the holding arm, and to which on its opposite side is anchored a backboard, the bottom edge of which is flush with the bottom end of the support arm; a pail holding band support which is flat on one side is anchored horizontally to, and across, the midsection of the backboard with the opposite side having a concave portion cut out to a depth of about one-half inch to match the contour of the pail; a narrow sheet metal pail holding band anchored in the concave area of the holding band support and equipped with a cam type lock for compressing the band around the pail and with tool hooks anchored to its outer side; a support rod having two parallell ends and a v-shaped horizontal base, with the parallell ends mounted between the backboard and the pail holding band support upon which horizontal portion the pail rests when placed within the pail holding band; and a sheet metal paint brush retainer, one edge of which is pressure-anchored between the backboard and holding band support and the opposite side bent in the shape of an inverted "v" thus providing additional holding pressure against the side of the brush.

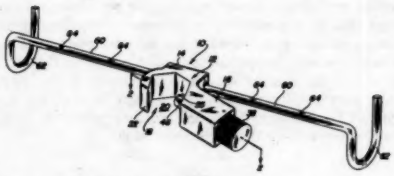
4,702,447
CLAMP DEVICE
Samuel M. Westwood, III, 2005 Linden St., Bethlehem, Pa. 18017
Filed Nov. 29, 1984, Ser. No. 676,108
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—231.5 17 Claims

1. A clamp device for interconnecting two entities comprising a longitudinally extending stem, a pair of jaws connected to one end of the stem with at least one of the jaws being movable in relation to the stem and the other of the jaws, means on the stem movable into engagement with the jaws to position the jaws in connecting engagement with one of the entities, and means on the stem for connection with the other of the entities, said means engaging the jaws including an internally threaded nut mounted on an externally threaded portion of the stem and being independent of the means on the stem for connection with the other of the entities, said movable jaw being mounted on the stem with a pivot pin to enable pivotal movement of the movable jaw, said pivotal jaw including a surface extending laterally of the pivot axis of the jaw engageable by the nut to exert rotational force thereon for pivoting the movable jaw toward the other jaw, said nut having a diameter whereby the



periphery of the nut is disposed outwardly at least sufficiently to be substantially in alignment with the outer edge of the laterally extending surface at its maximum lever arm relationship to said pivot pin for moving the movable jaw toward engagement with one of the entities to apply maximum torque and clamping force to the movable jaw and apply maximum locking force to the movable jaw when in clamped position.

4,702,448
SUPPORT BRACKET
Francis X. LoJacono, 26 Balboa Coves, Newport Beach, Calif. 92663, and Janet S. Roberts, 15927 Wicklow La., Huntington Beach, Calif. 92647
Filed Feb. 3, 1986, Ser. No. 825,313
Int. Cl.[4] A47B 96/06
U.S. Cl. 248—231.7 21 Claims



1. A support bracket comprising:
a body member having a receiving means defined by an opening therein to receive one of several types of support structures on which said support bracket is to be mounted;
an adjustable clamping means mounted in said body member and positioned for direct engagement with a support structure;
said clamping means including means for securing said clamping means in said body member; and
a pair of extension-support arms mounted to said body member and positioned opposite each other, whereby said extension-support arms project outwardly from said body member;
wherein said body member is formed with a heat portion extending outwardly therefrom, and wherein said extension-support arms are mounted in said head portion so as to be longitudinally aligned with each other and spaced away from said clamping means; and
wherein said clamping means comprises:
a threaded screw stud rotatably mounted in said body member;
a clamping sleeve threadably mounted on said screw stud, wherein said clamping sleeve moves longitudinally along said threaded screw stud as said stud is rotated; and
guide means positioned within aid body member whereby

said clamping sleeve is prevented from rotating within said body member, but said clamping sleeve is allowed to move longitudinally as said threaded screw stud is rotated.

4,702,449

CARDAN BALL SUSPENSION FOR MOTION SENSOR

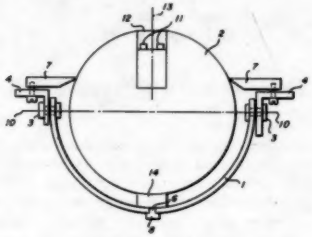
Hermann Zierhut, Munich, Fed. Rep. of Germany, assignor to Richard Hirschmann Radiotechnisches Werk, Fed. Rep. of Germany

Filed Apr. 23, 1986, Ser. No. 854,874

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1985, 3514570

Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—288.3 **12 Claims**



1. A cardan ball suspension comprising:

a ball;

a strap exhibiting a longitudinal slot extending over a portion of the straps length, said strap arranged essentially concentrically with said ball;

a pivoting joint connected to each end of said strap;

a cog, extending radially from said ball and exhibiting a rectangular cross-section cooperates with said longitudinal slot, allowing only longitudinal rotation of said ball relative to said strap; and

means for retaining said ball resting against a spherical surface of said ball.

4,702,450

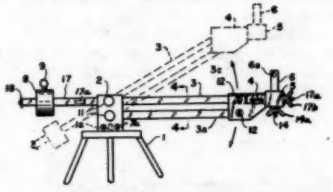
MOUNTING FOR ASTRONOMICAL BINOCULARS

Robert J. Barisa, R.D. #1, Box 210, Scenery Hill, Pa. 15360

Filed Feb. 3, 1986, Ser. No. 825,747

Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—292.1 **3 Claims**



1. An astronomical mounting for a viewing device, such as binoculars, comprising a support for said device, adjusting means for selectively rotating said support to any position along a circle in either a vertical or horizontal plane, including a parallelogram linkage having one end connected to said support and a tripod supporting the other end, insuring an unchanged horizontal plant of said support with any vertical plane change in the parallelogram linkage, an extension of said parallel linkage projecting from said tripod in the opposite direction from said viewing device, an adjustably slidable weight on said extension for counterbalancing the weight of said viewing device, screw means for holding said weight in any selected position on said extension, said tripod including knob means for selectively tightening and holding said other end of said parallelogram linkage in any desired position in a vertical plane, a block connected to said one end of said parallelogram linkage, and wherein said support has a hole for receiving a shaft extending from said block, said support having a second hole at right angles to said first-mentioned hole for receiving a threaded portion of a shaft of a viewing device supporting means, a pair of wing nuts, one on each of said shafts for clamping said support in any selected position along said vertical and horizontal plane whereby the sky can be explored comfortably, including directly overhead, without the necessity of holding said viewing device.

4,702,451

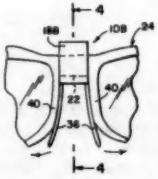
EYEGLASSES HOLDER

Don Salazar, Jr., and George Spector, both of 233 Broadway, RM 3615, New York, N.Y. 10007

Filed Sep. 20, 1985, Ser. No. 778,401

Int. Cl.[4] A47F *5/00*

U.S. Cl. 248—309.1 **1 Claim**



1. An eyeglass holder which comprises:

(a) plate member;

(b) means for affixing said plate member to a vertical flat surface;

(c) means for holding a bridge of a pair of eyeglasses, said holding means mounted to said plate member; and

(d) spaced resilient means extending from the second said means for engaging the eyeglasses frame to secure said eyeglasses on said holder, wherein said holding means includes:

(e) an arm extending horizontally from said plate member;

(f) a U-shaped member affixed to a free end of said arm for holding said bridge of said pair of eyeglasses spaced from said plates, wherein the third said means comprises:

(g) a spaced pair of spring holding fingers, each said finger having C-shaped cross section extending tangentially divergingly downward from said U-shaped member to engage the frame of said eyeglasses to keep said eyeglasses in a secured position.

4,702,452

SMOKE DETECTOR MOUNTING

Leonard Penar, 8507 S. Ada St., Chicago, Ill. 60620

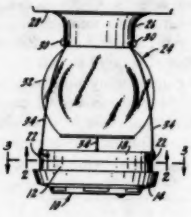
Filed Sep. 10, 1986, Ser. No. 905,350

Int. Cl.[4] A47H *1/10*

U.S. Cl. 248—317 **3 Claims**

1. Apparatus for mounting a smoke detector to an existing ceiling fixture of the type having a plurality of thumbscrews, said apparatus comprising a smoke detector having a housing and cover with a pair of mounting slots in the housing, a mounting plate having a pair of mounting screws adapted for engagemen with the mounting slots to effect attachment of the smoke detector to the mounting plate, the mounting plate having an area large enough to cover the smoke detector housing, a plurality of attachment elements connected to the

mounting plate, and a plurality of hangers, each connected at one end to an attachment element and connectable at the other



end to a thumbscrew so as to suspend the mounting plate beneath said fixture.

4,702,453

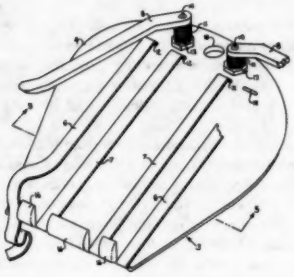
UNIVERSALLY POSITIONABLE BOOK HOLDER

John A. Bishop, 156 Williamsburg Ct., Albany, N.Y. 12203

Continuation-in-part of Ser. No. 559,737, Dec. 9, 1983, Pat. No. 4,620,687. This application Sep. 17, 1985, Ser. No. 777,000

Int. Cl.[4] A47B *97/04*

U.S. Cl. 248—447.2 **8 Claims**



1. A universally positionable book holder comprising a selectively shaped back plate having:

a multisection frontal lip at its lower portion;

four relatively secure strap attachment means near an upper portion of the back plate;

four quickly releasable strap attachment means on the back of the back plate;

four relatively inelastic straps affixed to the relatively secure attachment means on the upper portion of the back plate, which straps may be pulled downwardly and bent around a lower end of the back plate and secured to the quickly releasable strap attachment means;

a pair of stays pivotably mounted near the top of said back plate, on threaded pedestals, said pedestals comprising means for vertical adjustment of the stays;

attachment means on the back of said back plate;

a universally positionable support means attached to the attachment means on the back of said back plate.

4,702,454

BUFFER DEVICE FOR USE TO THE SEATS OF VEHICLES

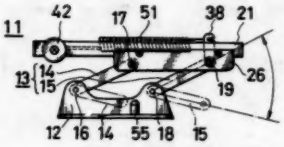
Satoshi Izumida, Koshigaya, Japan, assignor to Ikeda Bussan Co. Ltd., Kanagawa, Japan

Filed Mar. 11, 1985, Ser. No. 710,406

Claims priority, application Japan, Mar. 12, 1984, 59-46680

Int. Cl.[4] B60N *1/02*

U.S. Cl. 248—585 **6 Claims**



1. A buffer device for use with the seats of vehicles comprising:

a pair of floor brackets;

an upper frame disposed above said floor brackets;

front and rear links arranged parallel between said floor brackets and said upper frame to form a first parallel linkage mechanism for supporting said upper frame;

a pair of upper shafts extending between each link and swingably connecting an upper end of the front and rear links to said upper frame;

a pair of upper brackets on each of said upper shafts;

a connector rod both ends of which are supported by the upper brackets to form a second parallel linkage mechanism together with a line which passes between the upper shafts;

hooks projected upward from one of said upper shafts;

buffer members bridged between the hooks and the upper frame;

said connector rod comprising a cylinder member having a pair of ends, both ends of which are supported by said pair of brackets, said cylinder member having a plunger which strokes in the longitudinal direction; and

the plunger projecting through the cylinder member is connected, slidable up and down, to a guide member on a rear side of the upper frame.

4,702,455

TOOLING FOR MANUFACTURING CAGES FOR ROLLER BEARINGS

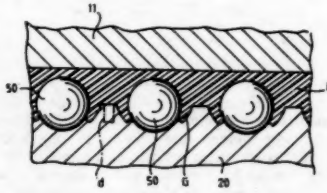
Jean-Paul Imbert, Villefranche-Sur-Saone, France, assignor to La Bellignite, France

Filed Oct. 30, 1986, Ser. No. 925,753

Claims priority, application France, Oct. 31, 1985, 85 16216

Int. Cl.[4] B29C *39/26, 45/36*

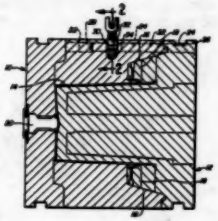
U.S. Cl. 249—79 **5 Claims**



1. Tooling for the manufacture of claw cages for roller bearings comprising a mold proper and an impression unit adapted to be placed inside said mold, said impression unit comprising a crown and a plurality of balls limiting a mold cavity defining a bridge, recesses and claws of such a cage,

wherein said impression member is constructed in several parts adapted to be made fast to one another, shaped to provide a multiplicity of recesses each having substantially the shape of a spherical cap portion, so that when said parts are assembled said recesses provide a multiplicity of substantially spherical housings in each of which is received a ball held in a pre-established position determining with accuracy a recess and claws of said mold cavity.

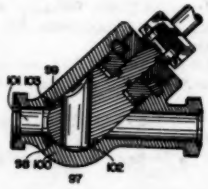
4,702,456
MOLD PIN LOCK
John W. Von Holdt, 6864 Lexington La., Niles, Ill. 60648
Filed Sep. 8, 1986, Ser. No. 904,618
Int. Cl.[4] B29C *33/30*
U.S. Cl. 249—165 **15 Claims**



1. In an openable and closeable mold which comprises at least two separable parts defining at least one parting line, the improvement comprising, in combination:

a passageway defined in one of said separable parts; a pin positionable to be in said passageway, said pin being secured to another of said separable parts; said passageway and pin extending essentially in the direction that said separable parts move to open and close along their parting line; a slot defined in said one separable part communicating between said passageway and the exterior of said mold, a portion of said pin occupying said slot when the mold is closed, whereby lifting means can enter said slot to engage said pin when the mold is closed, for lifting thereof.

4,702,457
BALL PLUG VALVE
Hyok S. Lew and Yon S. Lew, both of 7890 Oak St., Arvada, Colo. 80005
Continuation-in-part of Ser. No. 348,878, Feb. 16, 1982, abandoned. This application Apr. 28, 1982, Ser. No. 372,462
Int. Cl.[4] F16K *25/00*
U.S. Cl. 251—161 **13 Claims**



1. The ball plug valve comprising in combination:

(a) a valve body including:

(1) a cylindrical cavity with a closed substantially hemispherical end;

(2) a first fluid passage hole extending from said cylindrical cavity to one extremity of said valve body through said valve body wherein the central axis of said first fluid passage hole substantially passes through the center of the spherical surface including said substantially hemispherical end of said cylindrical cavity and substantially intersects the central axis of said cylindrical cavity in an oblique angle;

(3) a second fluid passage hole extending from said cylindrical cavity to the other extremity of said valve body through said valve body wherein the central axis of said second fluid passage hole substantially passes through the center of the spherical surface including said substantially hemispherical end of said cylindrical cavity and substantially intersects the central axis of said cylindrical cavity in an oblique angle;

(4) a first connection means disposed at said one extremity of said valve body for connecting said valve body to a pipe line;

(5) a second connection means disposed at said the other extremity of said valve body for connecting said valve body to a pipe line;

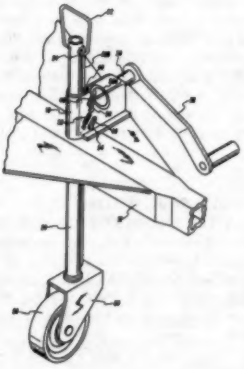
(b) a ball plug of cylindrical geometry having a substantially hemispherical end and rotatably engaging said cylindrical cavity included in said valve body in a close tolerance, said ball plug including a through hole wherein the central axis of said through hole substantially passes through the center of the spherical surface including said substantially hemispherical end of said ball plug and substantially intersects the central axis of said ball plug in an oblique angle;

(c) a closure having a hole plugging up the open end of said cylindrical cavity included in said valve body in a leak-proof fashion and thus retaining said ball plug within said cylindrical cavity;

(d) a valve stem coaxially connected to said ball plug, said valve stem rotatably engaging and extending through said hole through said closure in a leak-proof fashion; and

(e) means for rotating said valve stem for opening and closing of said ball plug valve.

4,702,458
QUICK RELEASE JACK
Billy J. Kendrick, 1104 Rice Ct., Arlington, Tex. 76012
Filed Jun. 2, 1986, Ser. No. 869,283
Int. Cl.[4] B66F *3/16*
U.S. Cl. 254—97 **16 Claims**



1. A jacking apparatus, comprising:

a shaft member having a plurality of teeth arranged longitudinally along the length thereof;

rotatable gear means having a plurality of gear teeth for mating with respective ones of the teeth of said shaft member;

means for rotating said gear means to move said shaft mem-

ber along a vertical axis when said gear teeth are in mating engagement with said shaft teeth;

user-operable means of securing said shaft member in a predetermined position with respect to said gear means so that said shaft teeth are in mating engagement with said gear teeth when said user-operable means is in a first position and for allowing said shaft member to be rotated to disengage said shaft teeth from said gear teeth when said useroperable means is in a second position; and,

a housing in which said gear means and at least a portion of said shaft member are disposed, said user-operable means including a movable stop member disposed between said housing and said shaft member.

4,702,459

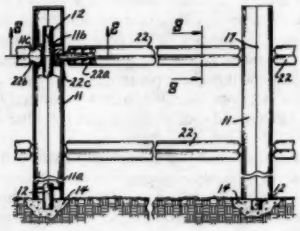
FENCE ASSEMBLY

Vernon D. Moschner, 1000 N. Fairlawn Cir. East, Evansville, Ind. 47711

Filed Oct. 30, 1986, Ser. No. 924,800

Int. Cl.[4] E04H *17/14*

U.S. Cl. 256—19 **5 Claims**



1. A fence assembly comprising a first fence post and a second fence post each having a side wall, and a crossrail interconnecting said first fence post and said second fence post, said side wall of each of said fence posts presenting a pocket and said crossrail having a generally ball shaped socket at each end thereof selectively and cooperatively received within said pocket, and where said generally ball shaped sockets are dimensioned to permit lateral and vertical crossrail movement, where said first fence post and said second fence post are each slidably and rotatably mounted on a shaft fixedly disposed at a desired fence post location, where the rotation of each of said fence posts permits the receiving of a crossrail at a first position and the assembly of said crossrail with said fence posts at a second position, where fastening means secure each of said fence posts at said second position after assembly, and where said fastening means extend through said shaft.

4,702,460

REVERSIBLE REFRACTORY PLATE IN SLIDING CLOSURE UNIT AND METHOD FOR USE THEREOF

Udo Muschner, Tönisvorst, Fed. Rep. of Germany, assignor to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Continuation of Ser. No. 678,033, Dec. 4, 1984, abandoned. This application Aug. 7, 1986, Ser. No. 893,447

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1983, 3345539

Int. Cl.[4] B22D *41/08*

U.S. Cl. 266—45 **20 Claims**

1. In a refractory plate for use as a stationary and/or as a movable closure plate in a sliding closure unit for controlling the discharge of molten metal from a metallurgical vessel wherein the movable refractory plate has therethrough a discharge opening and is slidable with respect to the stationary refractory plate having therethrough a discharge opening between an open position with the discharge openings in alignment and a closed position whereat a surface of the movable plate blocks the discharge opening of the stationary plate, the improvement wherein said refractory plate comprises:

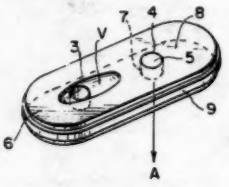
a refractory plate body having parallel opposite entirely planar surfaces including one said surface adapted to slidingly contact the other plate and another surface spaced therefrom;

said discharge opening extending through said body between said opposite planar surfaces;

at least one other discharge opening extending through said body between said opposite planar surfaces;

a stopper plug of refractory material sealingly closing said other discharge opening, said plug having a uniform shape throughout the length thereof in a direction axially of said other discharge opening;

whereby upon use of the unit with resultant erosion damage to said one surface around the first-mentioned said discharge opening of said refractory plate, said refractory plate may be reversed with said another surface adapted



to slidingly contact the other plate, with said one surface spaced therefrom, with said plug removed from said other discharge opening, and with a stopper plug of refractory material sealingly closing said first-mentioned discharge opening; and

said first-mentioned discharge opening and said other discharge opening being spaced from each other at respective locations such that, when said other discharge opening is plugged and the movable plate is moved toward the closed position of the sliding closure unit, said plug in said other discharge opening is located in an area of said one surface adapted to block the discharge opening of the other plate and such that, when said first-mentioned discharge opening is plugged and the movable plate is moved toward the closed position of the sliding closure unit, said plug in said first-mentioned discharge opening is located in an area of said another surface adapted to block the discharge opening of the other plate.

4,702,461

CHARGING ELECTRO FURNACES

Emil Herre, Herne; Gerd Herre, Oberhausen; Guenter Zimmer, Moers, and Hermann Cepin, Duisburg, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed May 16, 1984, Ser. No. 611,362

Claims priority, application Fed. Rep. of Germany, May 18, 1983, 3318475

Int. Cl.[4] C22B *4/08*

U.S. Cl. 266—216 **2 Claims**

1. Apparatus for feeding a metallurgical furnace from the top, comprising:

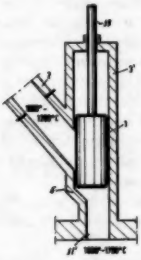
a top structure of the metallurgical furnace;

a cylinder extending upwardly and upright from the top structure of the furnace and having at its lower end a charge opening leading into the interior of the furnace;

a charge pipe for feeding raw charges to the furnace and extending obliquely from said cylinder for connection to a charge feeding facility;

a cermaic piston slideably disposed in said cylinder and having such a length that it can close off completely the charge pipe as feeding into the cylinder, or freeing the

charge pipe to permit full charge flow from the charge pipe; and



stop means included in the cylinder to establish a definite closing position for the charge pipe.

4,702,462

WATER-COOLED LANCE FOR BLOWING OXIDIZING GAS ONTO A METAL MELT

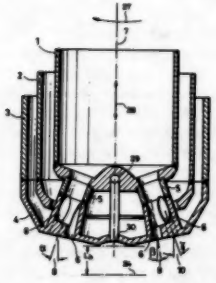
Ernst Fritz, Sulzbach-Rosenberg, Fed. Rep. of Germany, assignor to Klöckner CRA Technologie GmbH, Hamburg, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,534

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509795

Int. Cl.[4] C21C 5/32

U.S. Cl. 266—225 **10 Claims**



1. In a lance for blowing oxidizing gas onto a metal melt for afterburning reaction gases from said melt and transferring heat from said afterburning to said melt, said lance including means defining a gas supply duct extending along said lance and means for water-cooling said lance, the improvement comprising a head on said lance, a plurality of nozzles in said head, means communicating said nozzles with said gas supply duct and means defining a plurality of gas outlet openings in said nozzles, said gas outlet openings having center points lying on at least two concentric circles and said gas outlet openings being located and directed to produce individual streams of said oxidizing gas issuing therefrom.

4,702,463

GAS SPRING

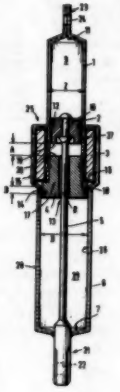
Hermann Krautkrämer, Bachstrasse 11, 5401 Bassenheim, Fed. Rep. of Germany

Filed Jun. 27, 1985, Ser. No. 750,014

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1984, 3428188; Mar. 29, 1985, 3511554

Int. Cl.[4] F16F 5/00

U.S. Cl. 267—64.26 **23 Claims**



1. A gas spring comprising a first cylinder filled with a gaseous medium and being closed at a bottom wall thereof; a second cylinder closed at a bottom wall and movable in said first cylinder in an axial direction thereof upon applying an external force to said second cylinder; a guide ring seal guiding said second cylinder in said first cylinder upon the movement thereof; said second cylinder having an inner chamber and a front side opening and being provided with a first piston connected to said second cylinder at said opening, said first piston being axially displaceable in said first cylinder; said first cylinder including a piston rod centrally positioned therein, said piston rod having a free end carrying a second piston which is axially movably guided in said second cylinder, whereby the gas spring develops a pressure force in the direction counter to the action of said external force, wherein said first piston is formed as a damping piston, said first cylinder having a portion with a smaller inner diameter and a portion with a greater inner diameter; and a sealing member arranged between said first piston and said portion with a smaller inner diameter in a normal condition, so that in the case of an emergency and an increased pressure of a gaseous medium in said portion with a smaller diameter of said first cylinder, said first piston together with said sealing member is displaced by the increased pressure into said portion with a greater diameter and therefore a gaseous medium can safely escape through a gap which is thusly formed between said sealing member and said portion with a greater diameter of said first cylinder.

4,702,464

GUIDE DEVICE FOR GUIDING A MOVABLE PART OF AN APPARATUS RELATIVE TO A FIXED PART OF THE APPARATUS

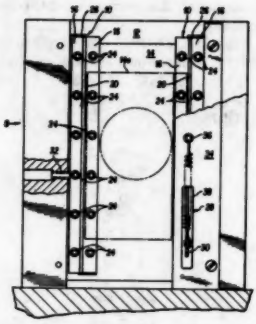
Ludwig Bauer, Schriesheim; Erwin Schneider; Walter Rensch, both of Nussloch, and Helmut Weinhold, Ketsch, all of Fed. Rep. of Germany, assignors to Cambridge Instruments GmbH, Fed. Rep. of Germany

Filed Aug. 5, 1985, Ser. No. 762,184

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430821; Sep. 12, 1984, 3433460

Int. Cl.[4] B26D 7/06

U.S. Cl. 269—55 8 Claims



1. A rotary microtome comprising

a housing,

specimen clamping means movable relative to the housing,

a first guide disposed on the housing,

a second guide disposed on the specimen clamping means,

bearing means disposed between the first and second guides and movable relative thereto, and

biasing means adapted to bias the bearing means towards a predetermined position.

4,702,465

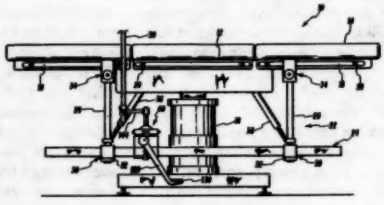
UNIVERSAL EXTREMITY POSITIONER

Bernard E. McConnell, Rte. 2, Box 87, Greenville, Tex. 75401

Continuation-in-part of Ser. No. 598,579, Apr. 10, 1984, Pat. No. 4,579,324, which is a continuation of Ser. No. 267,523, May 27, 1981, abandoned. This application Nov. 4, 1985, Ser. No. 794,388

Int. Cl.[4] A61G 13/00

U.S. Cl. 269—328 12 Claims



1. Apparatus for positioning a patient extremity in a predetermined position relative to the sterile zone of an operating table during a surgical procedure, said apparatus comprising:

(a) clamping apparatus including

(1) a first member comprising a generally spherical ball,

(2) a second member comprising a pair of opposed blocks, each block having a socket for receiving a portion of the spherical ball and an annular edge formed on each socket for gripping said ball substantially in line contact engagement,

(3) means for yieldably biasing said blocks toward each other for forceable engagement of said annular edges against said ball to retain said blocks and said ball in a predetermined position with respect to each other, said first and second members forming a coupling between said arm and said support means,

(4) release means for releasing said annular edges and said ball from said forceable engagement, and said release means comprising means for moving one of said blocks relative to the other of said blocks to reduce the biasing force acting on said ball;

(b) suspension means for attaching said clamping apparatus to an operating table including a bracket connected to one of said blocks; and,

(c) an elongated support arm connected to said spherical ball for holding patient support apparatus at an elevated position over the operating table.

4,702,466

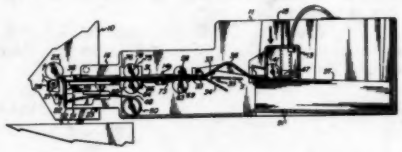
SHEET MATERIAL FEEDER FOR COPIERS AND OTHER SHEET PROCESSING APPARATUS

R. Clark DuBois, 332 Wakeman Rd., Fairfield, Conn. 06430

Continuation-in-part of Ser. No. 486,757, Apr. 20, 1983, abandoned. This application Feb. 4, 1985, Ser. No. 698,139

Int. Cl.[4] B65H 7/02

U.S. Cl. 271—10 15 Claims



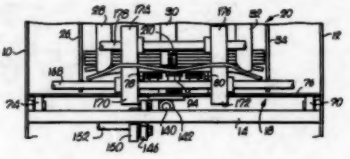
1. A paper sheet feeder for a copier having sheet receiving means including a feed roller, comprising a member defining a receptacle for a sheet stack, said member having vertically extending linear guide means, a sheet separator assembly for removing the top sheet from a sheet stack in said receptacle, said separator assembly including second guide means thereon mating with said vertical guide means so that said separator assembly may move vertically on said sheet stack as said sheet stack is depleted, at least one feed roller rotatably mounted on said separator assembly and positioned to engage the top sheet of a stack, feed roller drive means including a motor on said separator assembly, paper corner separators mounted to said separator assembly and arranged to engage the leading corners of a sheet stack whereby said separator assembly is supported on the sheet stack through said at least one feed roller, said sheet feeder including a transfer table between said sheet feeder assembly and the copier, said transfer table having upper and lower drive means for accepting a sheet from the stack and delivering an accepted sheet to the copier, sheet sensing means on said transfer table, said sheet sensing means being effective to energize said separator assembly motor to feed a sheet to said transfer table if no sheet is sensed on said transfer table and to de-energize said separator motor when a sheet is sensed on said transfer table.

4,702,467

MULTI-PURPOSE FEEDER FOR SUCCESSIVELY DELIVERING SINGLE SHEET OR MULTI-LEAVED ARTICLES FROM A STACK THEREOF

Charles N. Hannon, Olathe, Kans., assignor to Stepper, Inc., Olathe, Kans.

Continuation of Ser. No. 431,556, Sep. 30, 1982, Pat. No. 4,557,472. This application Nov. 25, 1985, Ser. No. 801,279
The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.
Int. Cl.[4] B65H *3/02*
U.S. Cl. 271—133 **19 Claims**



10. In mechanism for handling a normally flat, multi-section, floppy newspaper having a plurality of separate inner sections received within a generally transversely U-shaped outer section provided with a pair of opposite edge extremities, the improvement comprising:

means for bending the newspaper, including the outer section and its inner, contained sections, slightly to form at least one elongated ridge therein which extends from one of said extremities to the opposite extremity thereof,

said bending means being operable to support substantially all of the weight of the newspaper in the area of the ridge while leaving lateral edges of the newspaper substantially unsupported; and

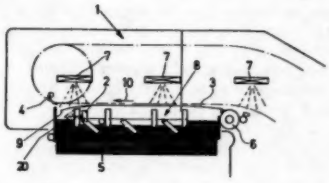
means for feeding the newspaper in the longitudinal direction of said ridge after formation thereof and while maintaining the ridge in the newspaper.

4,702,468

DEVICE IN THE DELIVERY OF SHEET-FED ROTARY PRINTING MACHINE FOR EXHIBITING CURL FORMATION ON THE LEADING EDGE OF A DELIVERED SHEET

Gerhard Pollich, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 403,794, Jul. 30, 1982, Pat. No. 4,561,645. This application Oct. 11, 1985, Ser. No. 786,849
The portion of the term of this patent subsequent to May 31, 2002, has been disclaimed.
Int. Cl.[4] B65H *29/24*
U.S. Cl. 271—195 **4 Claims**



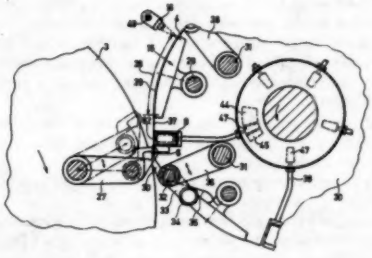
1. In a delivery system of a sheet-fed rotary printing machine having a conveyor for transporting a sheet in a given travel direction to a location of the delivery system at which a stack of sheets is deposited, a device for inhibiting curl formation in a leading edge of the sheet, comprising means for downwardly directing the sheet at the location at which the stack of sheets is deposited, and blowing units exclusively disposed at a location of the delivery system whereat, as viewed in the given travel direction of the sheet, a forward region of the stack of delivered sheets and a leading edge of the downwardly directed sheet are disposed, said blowing units having respective means located at opposite sides of the forward region of the stack and at opposite edges of the sheet adjacent the leading edge thereof for directing a controlled air jet substantially parallel to the sheet, with one directional component in the travel direction of the sheet and another directional component towards the middle of the sheet, along the underside of the downwardly directed sheet in vicinity of the leading edge of the sheet tending to curl, said blowing units, respectively, comprising a housing block formed with a threaded bore and air outlet openings for supplying air thereto via a hose connection and a check valve, and fastening means for fastening said housing block to a respective lateral sheet straightener.

4,702,469

APPARATUS AND METHOD FOR ALIGNING SHEETS

Willi Jeschke, and Gerhard Pollich, both of Heidelberg, Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Division of Ser. No. 593,648, Mar. 26, 1984, Pat. No. 4,615,520. This application Mar. 28, 1986, Ser. No. 845,890
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1983, 3311198
The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.
Int. Cl.[4] B65H *7/02*
U.S. Cl. 271—227 **22 Claims**



1. Device for aligning sheets fed by a sheet feeder to a sheet processing machine, comprising an aligning cylinder disposed downstream of the sheet feeder in sheet travel direction through the sheet feeder, a plurality of suction pull bars mounted in said aligning cylinder and drive means for displacing said suction pull bars transversely to the sheet travel direction, and positioning means for controlling said drive means, said aligning cylinder being disposed between a feed table and a pregripping cylinder, said plurality of suction pull bars being disposed in said aligned cylinder symmetrically distributed over the circumference thereof, and a plurality of front lays located on said aligning cylinder, each of said front lays being operatively associated with a respective one of said suction pull bars.

4,702,470

PAPER SUPPLYING DEVICE FOR PERFECTING PRINTING MACHINE

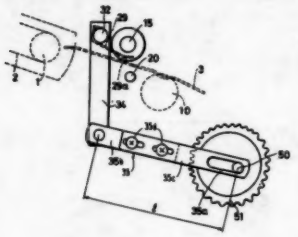
Koji Ishii, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Continuation-in-part of Ser. No. 734,249, May 14, 1985, abandoned, which is a continuation of Ser. No. 497,975, May 25, 1983, abandoned. This application Dec. 30, 1985, Ser. No. 815,306

Claims priority, application Japan, May 31, 1982, 57-81203[U]

Int. Cl.[4] B65H 9/14; B41F 13/24

U.S. Cl. 271—229 1 Claim



1. A paper supply device, comprising:

an upper roll supported by a shaft and being movable to engage a lower rotatable roll, paper guide means having an exit situated forwardly of said rolls, and paper pressing means located rearwardly of said rolls and movable so as to pressingly engage a driven paper;

cam follower means associated with said upper roller so that said upper roller engages said lower roller for driving a paper when said cam follower engages a cam;

printing means following said exit and including gripper means for gripping an end of said paper, said gripper means being fitted in an opening of a printed cylinder, said cylinder being provided with said cam at a periphery thereof;

said paper pressing means being operated synchronously with a printing operation so as to impart tension to said paper during printing;

said paper pressing means being always urged toward said paper guide means by a spring;

said paper pressing means being operated by a rotation of a shaft extending between a pair of spaced-apart frames of said paper supply device, and said shaft being connected to a rubber cylinder through link means and being rotatable by a predetermined angle in response to a rotation of the rubber cylinder; and further comprising

adjusting means for adjusting the length of said link means and, thereby, the period during which said pressing means engages said paper; and further comprising

gear means, rotating in synchronism with said rubber cylinder, for driving said link means; and wherein said link means comprises a first link portion coupled to said shaft, extending between said frames, a second link portion eccentrically coupled to said gear means, said first and second link portions being co-linear and having respective linearly extending slots therein, and further comprising releasable fastening means extending through said slots for adjusting the length of said link means.

4,702,471

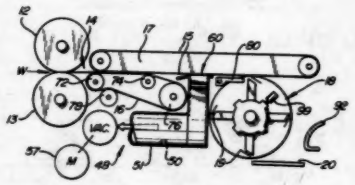
ARTICLE TRANSPORT ARRANGEMENT

David A. Smith, Midland, and Herbert B. Geiger, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 23, 1985, Ser. No. 812,485

Int. Cl.[4] B65H 29/32

U.S. Cl. 271—284 9 Claims



1. An article transport arrangement for conveying articles along a pair of generally parallel transport paths from a first location to a second location, comprising:

a pair of vacuum belt conveyors extending from said first location to said second location above said transport paths,

inverter roll means, adjacent said transport paths at said second location, for receiving articles from said vacuum belt conveyors and stacking articles in two piles beneath said vacuum belt conveyors, and

vacuum means, positioned between said inverter roll and said first location beneath said transport paths, for removing articles selectively from either or both of said vacuum belt conveyors, said vaccum means comprising,

a pair of vacuum chambers to which a partial vacuum may be supplied,

means defining a pair of collection openings positioned adjacent respective transport paths opposite said vacuum belt conveyors, each such collection opening communicating with a respective one of said pair of vacuum chambers, and

means for supplying a partial vacuum to said vacuum chambers, whereby articles may be ingested through said openings into said chambers from said vacuum belt conveyors.

4,702,472

TRAINING DUMMY FOR COMBAT SPORTS

Jacques C. V. Anquetil, 29 Route de Rouen, F-27300 Bernay, France

Filed Jun. 27, 1985, Ser. No. 749,433

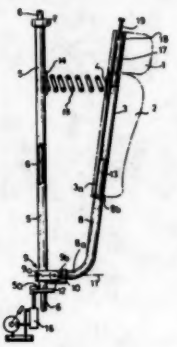
Claims priority, application France, Jun. 28, 1984, 84 10228

Int. Cl.[4] A63B 69/34

U.S. Cl. 272—76 8 Claims

1. A training dummy for combat sports comprising a lengthwise dorsal frame component a head portion carried by said frame component; a chest portion secured to said lengthwise dorsal frame component; and a support structure which comprises a substantially vertical fixing element having a lengthwise axis, a tubular sheath mounted coaxially on said fixing element for rotation about said axis, a support leg having two ends, one of which ends is connected to a lower part of said frame component, coupling means joining the other end of said support leg to said sheath, which coupling means comprises a bearing, said bearing including a first element which is integral with said sheath, a second element pivotally connected to said first element for rotation about a first horizontal axis and said second element accommodating said support leg for rotation about a second horizontal axis which is perpendicular to said first horizontal axis, the two horixontal axes being substantially perpendicular to said lengthwise axis of said fixing element, and resilient means disposed beteen the sheath and the frame

component, said resilient means urging the frame component away from the sheath, whereby said resilient means allows the



dummy to be deflected about a lower global articulation with three orthogonal axes and rise up after being struck by a user.

4,702,473

COMBINATION HAND WEIGHT AND WATER DISPENSER

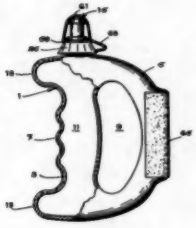
Daniel Paquette, 3132 Desautels, Montreal (Quebec), Canada H1N 3B7

Filed Jun. 18, 1986, Ser. No. 875,566

Claims priority, application United Kingdom, Jun. 24, 1985, 8515969

Int. Cl.[4] A63B *21/12*; B65D *37/00*

U.S. Cl. 272—117 **6 Claims**



1. Combination hand weight and water dispenser for distance runners or joggers, said combination comprising:

a hollow watertight body containing water and including: elongated straight hollow portion and an arcuate hollow portion integrally joining said straight portion at adjoining ends of said portions whereby to form an essentially D shape; said portions inwardly communicating together to provide a water reservoir and defining, therebetween outwardly of said body, a space suitable for the insertion of the hand of a user and of a size to substantially conform thereto;

finger grip means adapted to conform to the hand of a user on said straight portion on a face thereof opposite said hand insertion space, and

mouth-operable water dispensing value means at one end of said straight body portion, essentially coaxial therewith.

4,702,474

ARTICULATED HAND-HELD EXERCISE

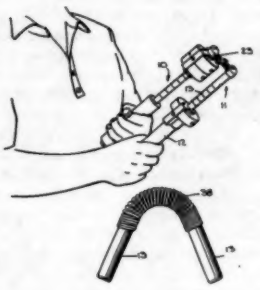
Raul Guibert, 87 Stratton Forest Way, Simsbury, Conn. 06070

Continuation-in-part of Ser. No. 627,663, Jul. 3, 1984, Pat. No. 4,557,479. This application Nov. 22, 1985, Ser. No. 800,960

The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.

Int. Cl.[4] A63B *11/00*

U.S. Cl. 272—122 **6 Claims**



1. An articulated hand-held exerciser comprising:

A. a pair of clubs each formed by a shaft having a rotatable handle;

B. a hinge consisting of a helical spring coupled to the ends of the club shafts, the hinge and the club coupled thereto being free from any external mounting, whereby the clubs may be caused by a user to assume parallel positions or may be angled relative to the hinge to create a free space between the hands and arms of the user;

C. a mass on each shaft which is axially adjustable therein to a desired setting, whereby the user is able to manipulate the exerciser in the parallel club mode or in an angled mode in which the user can process his wrists to rotate the interhinged clubs in said space.

4,702,475

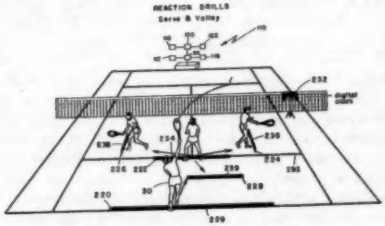
SPORTS TECHNIQUE AND REACTION TRAINING SYSTEM

Rick A. Elstein, Syosset; Svein Faret, Plainview, and John J. Gazzo, Commack, all of N.Y., assignors to Innovating Training Products, Inc., Syosset, N.Y.

Continuation-in-part of Ser. No. 766,913, Aug. 16, 1985. This application Jul. 25, 1986, Ser. No. 890,716

Int. Cl.[4] A63B *69/00, 69/38*

U.S. Cl. 273—1 GC **31 Claims**



1. A system for technique and accelerated reaction training of a person by a training program, comprising:

a. an array of lights to be positioned visibly in front of the person, with each light signifying a different particular movement pattern to be executed by the person in a given amount of time;

b. a control system for selectively energizing one light of the array at a time, signifying a particular movement pattern to be executed, in a sequence of energizing of the array of lights unknown to the person undertaking the training program, with the sequence of lighting of the array appearing to be random to the person, such that the person waits for an unknown light to be energized, and must then react in a measured time period with the particular movement pattern to be executed in response to that particular light, and the person then waits for the next unknown light to be energized, and must then react in a measured time period with the particular given movement pattern to be executed in response to that particular light, with the control system being programmable to enter a different individual time period of response for each different light, and also timing each individual time period of response; and

c. an acoustic transducer activated by said control system at the end of every individual time period of response to audibly signal to the person the end of every individual period, whereby the person in the program works to complete the particular movement pattern to be executed prior to hearing the audible signal.

31. A method of accelerated reaction training by improving predetermined patterns of sequenced muscle performance for participants in athletic endeavors; comprising the steps of:

defining a plurality of discrete predetermined movement patterns relative to a base position, each including a discrete predetermined pattern of sequenced muscle performance;

positioning a participant at said base position;

providing a plurality of selectively energizable discrete visible action signals, each indicative of a predetermined pattern of movement from said base position;

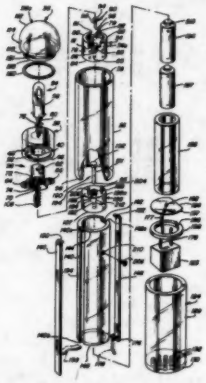
randomly activating one of said available plurality of discrete action signals to initiate performance of the discrete movement pattern indicated by the activated signal by said participant, and wherein said step of randomly activating one of said available plurality of discrete action signals is initiated by a return of the participant to the base position; and

indicating the time period within which an initiated pattern of performance is to be completed by generating an audible signal after every discrete action signal to provide an audible timing signal to the participant for every discrete action signal.

4,702,476
GAME SET OF DYADIC ARTICLES
Raymond R. Ostergren, 6300 W. Touhy Ave., Niles, Ill. 60648
Filed Aug. 15, 1985, Ser. No. 766,025
Int. Cl.[4] A63F *9/00*
U.S. Cl. 273—1 E **9 Claims**

1. A game set comprising: a plurality of individual game articles each comprising two companion playing pieces, each piece including mating means for mating with mating means on its companion piece, thereby to form the article, the mating means of the pieces of each article being non-matable with the mating means of the pieces of other articles in the set, and the pieces of each article being separable from each other, for playing a game of seeking to mate the mating means of one piece with the mating means of a companion piece,

a first playing piece of each of said articles having an end portion provided with a recess therein adjacent to a free end thereof, the mating means of said first playing piece being disposed within said recess and inwardly spaced apart from said free end to obscure the view of the mating means, and an end portion of a second playing piece of each of said articles being telescopically received within said end portion of the first playing piece in said recess



thereof for mating the mating means of said playing pieces within said end portion of the first playing piece.

4,702,477
GOLF PUTTER
James R. Solomon, R.R. 2, Box 220, Middletown, Ind. 47356
Filed Jul. 26, 1985, Ser. No. 759,420
Int. Cl.[4] A63B *53/02, 53/06*
U.S. Cl. 273—80 C **4 Claims**

1. A golf putter for putting a golf ball along a path of desired golf ball travel, said golf putter comprising;

a stright elongated shaft having a distal end and a proximate end, said shaft having a first longitudinal axis which lies in a vertical plane when said head lies in a striking position relative to said ball, said first longitudinal axis forming an angle between 5° and 30° with respect to an imaginary vertical line extended through said distal end;

a gripping means attached to said shaft adjacent said proximate end of said shaft and along the longitudinal axis thereof;

a head having a heel, a toe and a plurality of surfaces, including a planar striking surface, a rear surface, a sole surface extending between said planar striking surface and said rear surface, said sole surface additionally having a uniform arcuate curvature extending between said heel and said toe, and a top surface extending between said planar

striking surface and said rear surface, said head having a center of gravity;

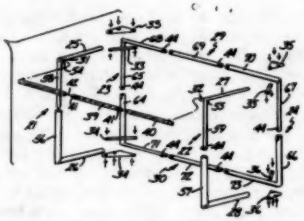
an attachment means for attaching said head to said distal end of said shaft so that said planar striking surface is between the golf ball to be stroked and said shaft, and so that, further, said center of gravity is between said first longitudinal axis and said planar striking surface, said attachment means including a straight shank having a second longitudinal axis said shank having a length such that the shaft is positioned ½ inch to 2 inches rearward of the head, said second longitudinal axis intersecting said first longitudinal axis at a right angle, and a cylindrical support section coaxial with said shank, said cylindrical support section joining said shank to said rear surface of said head at a point above the uppermost point of said sole surface whereby said shank is entirely above said sole surface, said second longitudinal axis being perpendicular to a horizontal line on said planar striking surface.

4,702,478

COLLAPSIBLE GOAL FRAME

Charles F. Kruse, 7343 W. 110th St., Bloomington, Minn. 55438

Filed Apr. 28, 1986, Ser. No. 856,198
Int. Cl.[4] A63B *71/00*
U.S. Cl. 273—127 B **10 Claims**



1. A collapsible sports goal having a net and a frame, said frame comprising:

a. a pair of front and a pair of rear hollow substantially vertical uprights, each of said uprights being comprised of two telescoping members and having means locking said telescoping members into an extended position, each of said front uprights having a short hollow extension forming a socket extending substantially perpendicular from its upper end;

b. a pair of upper and a pair of lower substantially horizontal side members, said side members having one end thereof attached to respective upper and lower ends of said front uprights, said side members further extending rearward and having the other end thereof abutting corresponding upper and lower ends of said rear uprights and attached thereto, said lower sidemembers having matter inside to add weight thereto;

c. one upper and one lower hollow substantially horizontal rear crossmember, the said upper crossmember extending crosswise between and attached to upper ends of said rear uprights, and said lower crossmember extending crosswise between and attached to lower ends of said rear uprights, said crossmembers each being comprised of three telescoping members with means locking said telescoping members into an extended position;

d. four hinges, each hinge being comprised of a pair of hinge plates and joining a said side member with a corresponding rear cross member into a movable relationship;

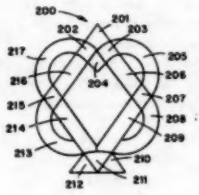
e. a substantially horizontal crossbar extending crosswise between upper ends of said front uprights, said crossbar being comprised of a pair of hollow end members and a hollow center member telescopically joined to said end members, an elastic cord, said elastic cord being threaded through said center member, stretched, and having its ends extending into and attached to said end members, said crossbar being detachable from said sockets on said front uprights, said net being attached to said frame members and extending over the area defined by said frame members except for an area defined by said front uprights and said crossbar extending between the upper ends thereof.

4,702,479

DISPLAY APPARATUS FOR PLAYING CARD SUITS

Joseph Banasiak, and Samuel L. Powers, both of Hendersonville, Tenn., assignors to Miniature Electronics, Inc., Hendersonville, Tenn.

Filed Mar. 5, 1986, Ser. No. 836,254
Int. Cl.[4] A63F *1/18*
U.S. Cl. 273—148 R **7 Claims**



1. A display apparatus for displaying any one of the four playing card suits of hearts, diamonds, spades and clubs, comprising:

a plurality of segments for being selectively displayed;

a first group of said segments being configured into a quadrangle to form the diamond, part of the heart and part of the spade;

a second group of said segments being configured into arches extending between positions proximate to the corners of the quadrangle and lying outside of the quadrangle, said second group of said segments forming the club, part of the heart and part of the spade; and

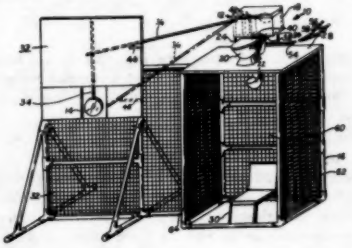
means for displaying any one of four sets of said segments so that the set of displayed segments form representations of any one of the four playing card suits.

4,702,480

FLUSHING BOOTH TARGET APPARATUS

Fred Popeski, 1544 Taki Dr., and Keith Pierce, 1748 Clifford Dr., both of Erie, Pa. 16505

Filed Apr. 7, 1986, Ser. No. 848,646
Int. Cl.[4] A63F *9/02*
U.S. Cl. 273—384 **20 Claims**



1. A water entertainment apparatus comprising:

support means,

a flush toilet means on said support means,

a target means,

said flush toilet means comprising water reservoir means,

bowl means and drain means, said drain means having an outlet means at its lower end,

said target means comprising a target actuator means actuated in response to a projectile striking said target means,

drain actuator means,

said water reservoir means being connected to said bowl means and said bowl means being connected to said drain means,

said target actuator means being connected to said drain actuator means,

stopper means between said water reservoir means and said bowl means,

said drain actuator means being connected to said stopper means,

occupant support means on said apparatus below said outlet means of said drain means whereby water from said drain means may engage an occupant on said occupant support means when said toilet is flushed by a projectile striking said target actuator means.

4,702,481

WELLHEAD PACK-OFF WITH UNDULATED METALLIC SEAL RING SECTION

Norman Brammer, Ventura, Calif., assignor to Vetco Gray Inc, Houston, Tex.

Filed Jul. 31, 1986, Ser. No. 891,705

Int. Cl.[4] F16J *15/12*

U.S. Cl. 277—116.2 **12 Claims**

1. A tapered pack-off for pressure sealing an annular tapered space formed between concentric cylindrical metal bodies of a subsea wellhead and a casing hanger when located subsea comprising;

an upper metallic seal ring,

a lower metallic seal ring,

said lower metallic seal ring being narrower than said upper metallic seal ring and disposed relative to said upper metallic ring such that the radially outer extent of both rings are the same while the radially inner extent of the lower metallic ring is radially greater thanthe radial extent of said upper metallic ring,

a serpentine undulating metallic band extending between said upper and lower metallic seal rings, and

elastomeric material in the undulations of said serpentine band, together to provide both elastomeric and metal-to-metal sealing of said annular tapered space.

4,702,482

SEALING ASSEMBLY WITH ELASTOMERIC ENERGIZING MEANS

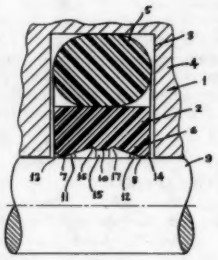
Gavin S. Oseman, Malvern, England, assignor to Dowty Seals Limited, Tewkesbury, England

Filed Jun. 23, 1986, Ser. No. 877,406

Claims priority, application United Kingdom, Jun. 29, 1985, 8516538

Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—165 **8 Claims**



1. A sealing assembly, suitable for sealing between two parts which are relatively-slidable one with respect to the other, including a sealing ring which is housed in an annular groove provided in one of said parts, which is formed with two axially-spaced-apart, circumferential, lip portions and which is also formed with a circumferential landed portion disposed between said lip portions, and, elastomeric energising means, also disposed in said groove and in engagement with said sealing ring, for urging said lip portions into fluid-sealing engagement with the other of said parts, said circumferential landed portion being, under conditions of low fluid pressure upon said sealing assembly, free from fluid-sealing engagement with said other part and being, under conditions of high fluid pressure upon said sealing assembly, caused to come into fluid-sealing engagement with that other part to supplement the sealing by said lip portions and to share with those lip portions contact stresses arising on relative movement of said parts under the high applied fluid pressure.

4,702,483

MECHANICAL SHAFT JOINT BOOT

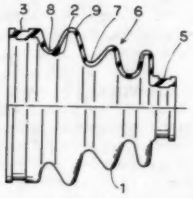
Mikio Ukai, Nagoya, and Ryoji Okumoto, Aichi, both of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Apr. 11, 1986, Ser. No. 850,693

Claims priority, application Japan, Apr. 13, 1985, 60-79101

Int. Cl.[4] F16D *3/84;* F16J *15/52*

U.S. Cl. 277—212 FB **3 Claims**



1. A mechanical shaft joint boot made of a polymeric elastomer comprising:

(a) a large-diameter ring provided at a first end of said boot;

(b) a small-diameter ring provided at a second end of said boot;

(c) a corrugated bellows formed between said large-diame-

ter ring and said small-diameter ring and comprising an alternating series of troughs and crests; each trough comprising a radially inwardly-convex apex flanked on opposite sides by a first oblique side wall disposed nearer said first end of said boot and a second oblique side wall disposed nearer said second end of said boot, said first and second side walls of each trough diverging from one another as they extend away from the respective said apex; and each crest comprising a radially outwardly convex apex flanked on opposite sides by a first oblique side wall disposed nearer said first end of said boot and a second oblique side wall disposed nearer said second end of said boot, said first and second side walls of each crest diverging from one another as they extend away from the respective said apex; the second side wall of each said trough which is flanked towards said second end of said boot by a respective said crest also constituting the first side wall of such crest, and the second side wall of each said crest which is flanked towards said second end of said boot by a respective trough also constituting the first side wall of such trough;

(d) said series including a first said crest and being the crest disposed nearest said first end of said boot;

(e) said series including a first said trough, said first trough flanking said first crest and being formed between said large-diameter ring and said first crest;

(f) a second said trough flanking said first crest and being formed between said first crest and said small diameter ring, the internal diameter of said apex of said second trough being smaller than that of said first trough; and

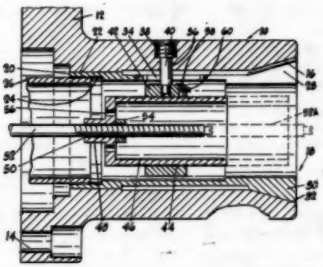
(g) a circumferentially extending strip which is convex in transverse cross-sectional shape and which is formed internally of said bellows on one of the second side wall of said first trough and the first side wall of said second trough at a site which is longitudinally displaced from the apex of the respective said trough and which comes into contact with the other of the first side wall of said second trough and the second side wall of said first trough on a side of said bellows which becomes compressed during a crossing movement of said bellows.

4,702,484

COLLET CHUCK WITH INTERNAL AND EXTERNAL WORK STOPS

Thomas K. Sandwick, 5585 Collingwood, Kalamazoo, Mich. 49004

Filed May 19, 1986, Ser. No. 864,206
Int. Cl.[4] B23B *31/20*
U.S. Cl. 279—1 S **6 Claims**



1. In a collet chuck having a tubular body with means at its inner end adapted to be secured to the spindle of a lathe, and an inwardly converging cam surface at the outer end of its internal surface, and a tubular collet slidably supported within said body and having an actuating means at its inner end, said collet being axially slotted from its outer end to provide plural work gripping fingers, said fingers having external cammed surfaces at their outer ends co-acting with the cam surface of said body, work stop means comprising:

a cylindrical stop element having a threaded outer surface located centrally within said tubular collet and further having a transverse wall defining a central threaded aperture,

a rod-like second stop element threadedly engaged through said aperture and adjustably projecting therefrom,

a cylindrical ring member threadedly engaged with the thread on said first stop element,

and at least three centering screws threadedly engaged through radial holes provided therefor in spaced relation around said body inwardly of the cammed surface therein,

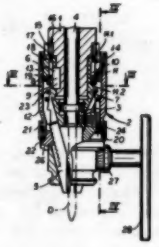
said screws having radially abutting and axially interlocking engagement with said ring member and passing through said slots in said collet.

4,702,485

PERCUSSION DRILL AND CHUCK ARRANGEMENT THEREFOR

Günter H. Röhm, Heinrich-Röhm-Str. 50, 7927 Sontheim, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,421
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509165; Apr. 27, 1985, 3515259
Int. Cl.[4] B23B *31/04;* B25D *17/08*
U.S. Cl. 279—19.4 **18 Claims**



1. A percussion drill comprising:

a rotatable percussion drill spindle;

a drive rod axially guided in said spindle for imparting percussion action to a drill bit;

a drill chuck adapted to receive said bit and mounted on said spindle for rotation therewith, said chuck having a body with an axially directed passage traversed by said rod for transferring the action of said drive rod to the bit, said chuck body being formed with circumferentially disposed recesses, and jaws on said body for holding said bit;

at least one coupling element for rotationally connecting said drill chuck to said drill spindle and enabling axial play of said chuck on said spindle;

a control ring for actuating said jaws, said control ring having teeth formed in one face thereof; and

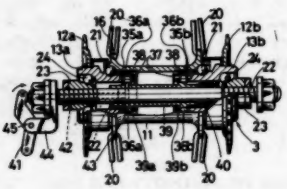
a locking mechanism including a coupling ring and at least one lock element fixed with respect to said drill spindle, but being actuatable by said coupling ring, and being adapted to be moved into a respective one of said circumferential recesses of said chuck body for precluding axial displacement of said chuck body on said spindle, said coupling ring being mounted for displacement in axial direction, but securable against rotation, said coupling ring, at its rim which is directed towards said control ring, having a plurality of teeth which on axially positioning of the coupling ring towards the drill end of the chuck can operatively engage in the teeth of said control ring.

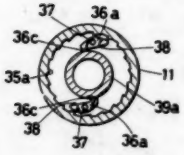
4,702,486

DRIVING DEVICE FOR BICYCLE

Kimihiro Tsuchie, 35-1 Kinugasa Tenjinmori-cho, Kita-ku, Kyoto, Japan

Continuation of Ser. No. 507,795, Jun. 24, 1983, abandoned. This application May 9, 1986, Ser. No. 863,803
Claims priority, application Japan, Jul. 9, 1982, 57-120341
Int. Cl.[4] B62M *1/04*
U.S. Cl. 280—255 2 Claims





1. A driving device of a bicycle including a pedal system having a left and a right pedal which undergo repeated reciprocating motion and a hub section having a left and a right uni-directional clutch mechanism for transmitting treading force applied to each pedal independently to a driving wheel as forward torque, wherein the improvement comprises a clutch control means which is operable by a rider to disconnect a connection between the pedals and the driving wheel such that the driving wheel can be rotated in a reverse direction without transmitting the reverse rotation to the left and right pedals and said hub section comprises:

left and right drivers each having a sprocket fixedly mounted on its periphery and being freely rotatable on a hub shaft set therethrough at the center thereof;

a hub shell of said driving wheel being freely rotatable with respect to said driver;

a clutch mechanism provided between each driver and said hub shell; and

a clutch control mechanism serving as a control mechanism according to manipulation by the bicycle rider and also acting to connect each driver and said hub shell or disconnecting the same therefrom;

wherein said clutch mechanism includes:

an internal gear type ratchet gear provided in a bore of said hub shell;

a ratchet pawl pivotally attached to said driver;

a slider carried by said hub shaft to be slidable axially thereon;

a control lever to be manipulated by the bicycle rider for controlling the position of said slider; and

a large diameter portion formed in said slider for releasing engagement between said ratchet pawl and said ratchet gear through tilting of said ratchet pawl of said clutch mechanism caused by its coming into contact therewith.

4,702,487

PROCESS OF ORGANIC MATERIAL EXTRACTION FROM BITUMINOUS SANDS OR OIL BEARING SANDS

Anatol Stoian; Nicolita Panaitescu, and Marioara Tuliu, all of Bucharest, Romania, assignors to Institutul de Cercetari Si Poriectari Pentru Petrol Si Gaze, Cimpina, Romania

Continuation-in-part of Ser. No. 269,821, Jun. 3, 1981, abandoned. This application Jul. 7, 1983, Ser. No. 511,792
Int. Cl.[4] C10G *1/04*
U.S. Cl. 208—390 10 Claims

1. A cold water diluent process for recovering oil from bituminous or conventional oil sands thereafter referred to as oil sands, including the steps of:

(a) conditioning the optionally crushed oil sand, by diluent slurrying in a rotating drum, provided on its outlet end with a screen to reject oversized rocks, lumps, so that the diluent/oil ratio is between 1.4 and 3.4;

(b) introducing the slurry into the lower part of one or successively two helical, classifier type, separators, to be scrubbed in counter-current with diluent, fed into the upper part of the separator(s) by spraying;

(c) withdrawing from the lower part of the first helical separator a rich oil-diluent product having a diluent/oil ratio between 2.8 and 4.0, with some fine silt and clay, and recovering most of the oil contained in the sand;

(d) refining by a conventional method, this low viscosity oil-diluent product as to obtain:

an oil product, free of contaminants;

a product containing the impurities, with some oil and diluent;

a diluent product to be recycled in the process;

(e) feeding the sand, saturated with diluent and relatively little oil, withdrawn in the upper part of the second helical separator, into a separation column to settle, first through a diluent upper layer and then through an aqueous medium, under and in direct contact with the diluent layer, to the bottom of the column, essentially free of oil;

(f) introducing, into the said column, diluent, under the diluent-water media interface and a mixture of slightly alkaline, not dispersing clay, recycle and fresh water, and process control additives, into the lower part of the aqueous medium, as to maintain constant characteristics and a slightly upwardly moving of the media;

(g) withdrawing from the said column:

a diluent stream with little oil in the upper part;

an aqueous impurified middling, in the opposite part of diluent and water inlets and between them;

a sand settled in the bottom;

(h) recycling the diluent with little oil to the first scrubbing stage;

(i) treating the aqueous medium by conventional method to obtain:

remanent oil and diluent, if any;

clarified water to recycling;

a fine waste;

(j) disposing, or, if necessary, finally cleaning the sand by scrubbing in a helical, classifier type, separator, in counter-current with water and with process control additives.

4,702,488

STEERING SYSTEM FOR TRACTOR-TRAILER UNITS

Lloyd A. Baillie, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 681,754, Dec. 14, 1984, abandoned. This application May 15, 1986, Ser. No. 863,661
Int. Cl.[4] B62D *13/02*
U.S. Cl. 280—426 17 Claims

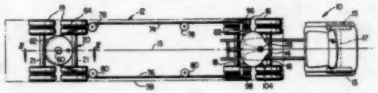
1. A system for controlling the turning of a semi-trailer of a tractor-trailer unit relative to the tractor wherein the tractor has steerable wheels and is connected to the trailer for turning movements relative to the trailer, said trailer including a frame and a rear wheel bogie assembly supported on said trailer for

pivotable movement about a generally vertical pivot axis relative to said trailer frame, said system comprising:

cam means secured to said tractor and pivotable relative to said trailer frame about a pivot connection between said trailer and said tractor;

flexible cable means including opposed cable traces extending along said trailer frame and connected to said bogie;

cam lever means pivotally secured at pivot means on said trailer at a point forward of said bogie and connected at its opposite ends to respective ones of said cable traces; and



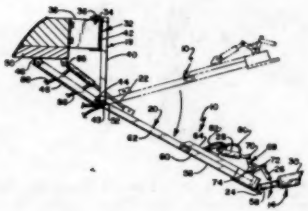
cam follower means connected to said lever means at spaced apart points on opposite sides of said pivot means and engageable with said cam means, said cam means and said cam follower means being cooperable in such a way that in response to turning of said tractor relative to said trailer when said bogie is trailing said tractor during an initial portion of a turn of said tractor said bogie continues in a pre-turn direction of travel of said trailer, and during a further portion of a turn of said tractor said bogie pivots relative to said frame so that the path of said bogie follows substantially the same path as said tractor through said turn.

4,702,489

APPARATUS FOR LIFTING AN END OF A HITCH

Norton J. Erickson, 1250-13th St. NW., New Brighton, Minn. 55112

Filed Sep. 26, 1985, Ser. No. 780,657
Int. Cl.[4] B60D *1/10*
U.S. Cl. 280—479 A **1 Claim**



1. Apparatus for lifting an end of a hitch, said end resting on the ground, said hitch being attached to a wheeled device, said apparatus being attached to a self propelled vehicle, said apparatus comprising:

a frame;

means for attaching said frame to said vehicle;

a rigid member pivotally attached to said frame, said rigid member having a bottom side and a free end, said rigid member including means for scooping underneath the end of said hitch off the ground, said scooping means including a plate fastened to the bottom side of said rigid member and extending beyond the free end of said rigid member;

means for remotely pivoting said rigid member with respect to said frame; and

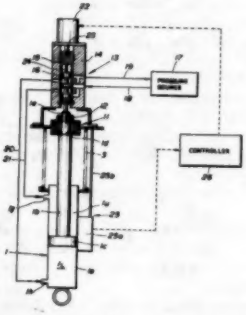
means in cooperation with said scooping means for remotely connecting said hitch and said rigid member, said connecting means including a pin and means for remotely moving said pin into engagement with said hitch whereby said hitch is supported by said plate and engaged by said pin, said moving means including means for pivotally attaching said pin to said rigid member, said moving means further including a hydraulic actuator attached between said pivotal attaching means and said rigid member and means for energizing said actuator.

4,702,490

POSITIVELY CONTROLLER AUTOMOTIVE SUSPENSION SYSTEM

Hirotsugu Yamaguchi, Chigasaki; Naoto Fukushima, Kamakura; Yohsuke Akatsu, Yokohama, and Sunao Hano, Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Feb. 24, 1986, Ser. No. 832,578
Claims priority, application Japan, Feb. 25, 1985, 60-36082; Feb. 25, 1985, 60-36083
Int. Cl.[4] B60G *17/08*
U.S. Cl. 280—707 **16 Claims**



1. An automotive suspension system comprising:

a hollow cylinder defining a chamber;

a piston thrustingly received within said chamber of said cylinder and defining therein a first and second fluid chambers, both filled with a working fluid said piston being free to move axially within said chamber;

a fluid pressure source;

a hydraulic circuit connecting said first and second fluid chamber and said fluid pressure source;

a pressure control valve disposed within said hydraulic circuit and selectively establishing and blocking fluid communication between said first and second fluid chamber and said fluid pressure source;

first means, responsive to relative displacement between a vehicle body and road wheel assembly out of a predetermined normal range, for controlling said pressure control valve so as to adjust the fluid pressure in said first and second fluid chambers in order to adjust the relative distance between said vehicle body and said road wheel assembly back to within said predetermined normal range; and

second means, responsive to bounding and rebounding motion of said road wheel relative to said vehicle body, for controlling said pressure control valve so as to adjust the fluid pressure in said first and second fluid chambers to assist smooth displacement of said piston within said cylinder thereby absorbing bounding and rebounding energy which would otherwise be transmitted to said vehicle body.

4,702,491

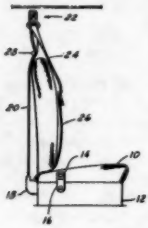
QUICK DISCONNECT THREE POINT SAFETY RESTRAINT SYSTEM

Christopher D. Meyer, Sterling Heights, Mich., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Oct. 30, 1986, Ser. No. 925,711

Int. Cl.[4] B60R *21/10*

U.S. Cl. 280—801 2 Claims



1. In a motor vehicle wherein non-driver seats are removable from the vehicle, a quick disconnect three point safety restraint system adapted to be removed with each seat and contained therewith, said system comprising:

a retractor means forming one point of the safety restraint system and containing a spool of webbing;

buckle means forming a second point of the safety restraint system spaced from said retractor means;

said retractor means and said buckle means being connected to the seat frame of the removal seats;

a bracket means mounted on the back of the removable seat for retaining said webbing along the rear surface of the seat;

an adjustable tongue means slideably positioned on the webbing;

an anchor means mounted to the vehicle frame in such a position to function as the third point of the safety restraint system, said third point being a pivot position for the webbing; and

a quick disconnect means including a receptacle mounted on said anchor means and a tongue means for mating with said receptacle including a "D" ring having a smooth coated surface for slidingly receiving the webbing for providing the pivot for the webbing, said disconnect means operable to detach the safety restraint system from said vehicle when the removable seats are removed from the vehicle.

4,702,492

SEAT BELT SYSTEM FOR VEHICLES

Rudolf Andres, Sindelfingen; Heinz Knoll, Stuttgart; Volker Petri, Aidlingen, and Harald Pfistner, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Apr. 14, 1986, Ser. No. 851,814

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1985, 3513339

Int. Cl.[4] A62B *35/02*

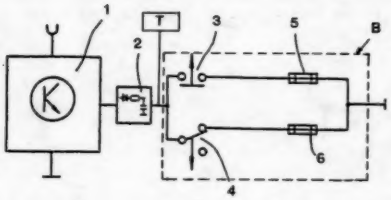
U.S. Cl. 280—801 11 Claims

1. Vehicle passenger safety system apparatus for use with a vehicle of the type having safety belt means with a belt buckle and a belt latch selectively lockably engageable at the belt buckle, and having accident indication electrical signal generating means for generating an accident indicating electrical signal in response to the vehicle experiencing forces indicative of a vehicle accident, said safety system apparatus comprising:

lock closure indicating switch means movable between open and closed positions in dependence on whether said belt latch is locked;

first electrical indicating means arranged in series with the lock closure indicating switch means and the accident indicating electrical signal generating means;

belt tension indicating switch means movable between open and closed positions in dependence on belt tension forces exceeding a predetermined value corresponding to forces experienced when a passenger is retained by the seat belt during a vehicle accident;



and second electrical indicating means arranged in series with the belt tension indicating switch means and the accident indicating electrical signal generating means in parallel to the lock closure indicating switch means and first electrical indicating means.

4,702,493

DEVICE FOR ADJUSTING THE POSITION OF A STRAP RETURN ELEMENT, OF IN PARTICULAR A SAFETY BELT FOR A MOTOR VEHICLE

Gérard Escaravage, Valentigney, France, assignor to Aciers et Outillage Peugeot, Audincourt, France

Filed Oct. 23, 1986, Ser. No. 922,508

Claims priority, application France, Oct. 24, 1985, 85 15831; Feb. 7, 1986, 86 01717

Int. Cl.[4] B60R *22/02*

U.S. Cl. 280—808 17 Claims

1. A device for adjusting the position of a strap return element of in particular a safety belt for a motor vehicle, said device comprising a tube, an electric driving motor having a field magnet, a shaft and an armature fixed on the shaft, the motor being mounted in the tube to be movable axially in the tube between two end positions an anchoring pin mounted on the motor, the strap return means being mounted on the anchoring pin so as to be movable by the motor between said two end positions, a control element for setting the position of the strap return element and the motor at any point of the travel between said two end positions, means for supplying current to the motor through the medium of the control element, means for preventing the rotation of the armature relative to the tube, the field magnet being rotatable about the armature and relative to the tube, the field magnet having an outer surface at least a part of which surface carries a screwthread, complementary screwthread means connected to the tube and cooperative with the screwthread of the field magnet in such manner as to move the motor and consequently the strap return element axially relative to the tube when the field magnet rotates, the means for preventing rotation of the armature comprising a slot in the tube, an end portion of the anchoring pin projecting into the tube through the slot, and fixing means for fixing

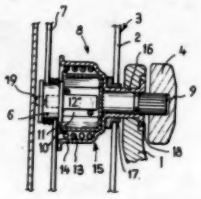
the end portion of the anchoring pin to the shaft of the armature.

4,702,494

DEVICE FOR ADJUSTING THE POSITION OF A STRAP RETURN ELEMENT OF A SAFETY BELT

Gerard Escaravage, Valentigney, France, assignor to Aciers et Outillage Peugeot, Audincourt, France

Filed Oct. 29, 1986, Ser. No. 924,468
Claims priority, application France, Oct. 30, 1985, 8516139
Int. Cl.[4] B60R *22/20*; F16H *29/02*
U.S. Cl. 280—808 8 Claims



1. A device for adjusting the position of a strap return element of a safety belt, in particular for a motor vehicle, said device comprising a guide rail, the strap return element being mounted to be movable between two end positions in the guide rail, a drum, a connecting element wound around the drum and having two ends for connection to the vehicle, actuating means, coupling means for connecting the actuating means to the drum, the strap return element being mounted on the coupling means, whereby the actuating means are capable of driving the drum selectively in either of two directions of rotation of the drum through the coupling means so as to shift the strap return element to any point of an adjusting travel defined by said two end positions, and means for preventing the rotation of the drum relative to the rail when a force is exerted on the strap return element.

4,702,495

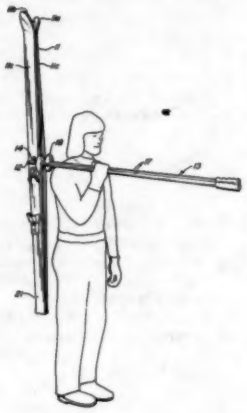
SKI POLE RECEIVER

Gary E. Roda, 367 Rugby Ave., Berkeley, Calif. 94708

Continuation-in-part of Ser. No. 761,693, Aug. 2, 1985, Pat. No. 4,630,842. This application Aug. 6, 1986, Ser. No. 893,732
The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.
Int. Cl.[4] A63C *11/02*
U.S. Cl. 280—814 4 Claims

1. In combination with a snow ski having a top surface and a longitudinal axis, and a ski pole having a generally cylindrical tip portion, a ski carrier accessory comprising;

a ski pole tip receiver means rigidly and non-rotatably secured to the top surface of the ski, said means defining a generally cylindrical space sized to receive and retain the cylindrical ski pole tip portion in close co-axial relationship wherein the axis of the cylindrical space is generally perpendicular to the longitudinal axis of the ski and generally parallel to the top surface of the ski and wherein said ski pole tip receiver means is further described as having interior walls defining a first tapered cylindrical space including an opening into which a ski pole tip can be inserted wherein the diameter of the cylindrical space decreases from the opening inward to a diameter less than a diameter of the ski pole tip whereby a ski pole inserted into the opening of the cylindrical space will frictionally engage the defining walls of the cylindrical space forming a temporary connection between the receiver means and the ski pole tip, and whereby the ski pole is effectively secured to the ski at a right angle to the longitudinal axis of the ski which orients the ski generally vertically along



a skier's back when the ski pole is supported on the skier's shoulder.

4,702,496

BOOK BINDING PROCESS INVOLVING PRIMER ADHESIVE CONTAINING STARCH

Robert M. Hume, III, Cottage Grove, Minn., assignor to H. B. Fuller Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 866,362, May 23, 1986, which is a division of Ser. No. 773,456, Sep. 9, 1985, Pat. No. 4,608,111, which is a division of Ser. No. 600,400, Apr. 16, 1984, Pat. No. 4,564,649. This application Aug. 19, 1986, Ser. No. 898,446
Int. Cl.[4] B42C *9/00, 11/00*; B42D *1/00*
U.S. Cl. 281—15 R 17 Claims

1. A continuous book-binding process comprising:

(a) roughing and cutting an assembly of a sufficient number of signatures resulting in a signature assembly having a high surface area location for the application of adhesives;

(b) applying to the high surface area location an aqueous primer adhesive;

(c) applying a hot coating of an adherent covering adhesive to the aqueous primer adhesive coating; and

(d) contacting the adherent coating with a book cover, wherein the primer adhesive contains an adhesive latex and an amount of ungelatinized granular starch which complexes a major portion of the latex water and coalesces the primer adhesive to form a flexible film during step (c) without the application of external heat in a step between steps (b) and (c) which complexes essentially all of the primer water.

17. A book formed by the binding process of claim 1.

4,702,497

METHOD OF ENCODING A SYMBOL OR MESSAGE ON A PLASTIC MATERIAL AND AN ARTICLE ON WHICH A SYMBOL HAS BEEN SO ENCODED

Tomas H. Newbery, Ridge Rd., Glen Cove, N.Y. 11542

Filed May 2, 1986, Ser. No. 858,687
Int. Cl.[4] G09C *5/00*; B42D *15/00*; B29C *59/02, 61/00*
U.S. Cl. 380—59 6 Claims

1. A method of making reappear a symbol by message that has been encoded on a block of plastic or enscribing under pressure the symbol or message on a surface of the block while said block is at an elevated temperature, cooling said block to approximately room temmperature and physically removing the inscription while the block is at approximately room tem-

perature, said method of making the symbol or message reappear comprising the steps of heating the block so previously treated to approximately the temperature at which the symbol or message was enscribed, said heating continuing until the symbol or message reappears.

4. An article comprising a tablet of plastic material with a latent image, which image was impressed by the simultaneous application of heat and pressure and which image has been physically removed at room temperature temporarily, such that when the block is reheated to the temperature used during the impressing of the image, the image will reappear.

4,702,498

FLANGE CONNECTION FOR FIBER-REINFORCED PLASTIC PIPE PIECES

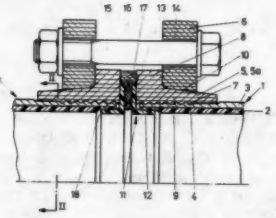
Wilhelm Mueller, Neuhausen; Friedhelm Overath, and Michael Weyer, both of Schaffhausen, all of Switzerland, assignors to Georg Fischer Aktiengesellschaft

Filed Oct. 21, 1986, Ser. No. 921,676

Claims priority, application Switzerland, Oct. 31, 1985, 4693/85

Int. Cl.[4] F16L *58/00*

U.S. Cl. 285—55 **5 Claims**



1. A flange connection for fiber-reinforced plastic pipe pieces, wherein the pipe is composed of an inner layer of thermoplastic material and an outer layer of wound fiber impregnated with synthetic resin, a flanged sleeve each having a flange portion and a sleeve portion glued onto the ends of the pipe pieces to be connected, each flanged sleeve axially split into two parts, wherein the flange portions of the sleeves face one another in axial direction and the sleeve portions of the sleeves extend away from the flanges, a loose flange ring each placed on each flanged sleeve, a cover ring each fixed to the pipe pieces to be connected so as to cover the pipe ends, the radially outwardly facing surface of the ends of the pipe pieces to be connected including matching circumferentially extending grooves and projections for securing the connection of the flanged sleeves to the pipe pieces in axial direction, wherein the radially outwardly facing surface of the sleeve portion of the flanged sleeve is conically inclined so that the width of the sleeve portion decreases away from the flange portion, and the corresponding radially inwardly facing surface of the flange ring is conically inclined so that it matches the radially outwardly facing surface of the sleeve portion, whereby the flange ring is capable of holding the two parts of the flanged sleeve together during the preparation of the glued connection.

4,702,499

HINGEABLE SEGMENTED PIPE COUPLINGS

Peter G. deRaymond, Nazareth, Pa., and Robert Rung, Hopatcong, N.J., assignors to Victaulic Company of America, Easton, Pa.

Filed Oct. 21, 1986, Ser. No. 921,970

Int. Cl.[4] F16L *17/04*

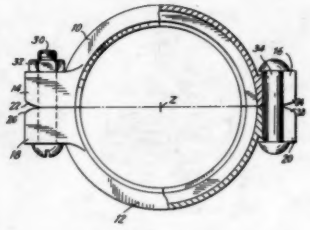
U.S. Cl. 285—112 **32 Claims**

1. A coupling segment for a hingeable segmented pipe coupling, including;

an arcuate member having an internal recess for the reception of a sealing gasket; and,

bolting pads at the respective ends of said arcuate member for the reception of securing members, whereby a plurality of said coupling segments can be assembled into a segmented pipe coupling; further including

at least one said bolting pad including a planar bolting face portion and an opposite face portion extending radially of the longitudinal axis of said coupling segment, and, an arcuate bolting face portion providing an outward continuation of said planar bolting face portion;



said arcuate bolting face portion comprising a curved surface having its longitudinal axis of generation extending parallel to said opposite face of said bolting pad and extending parallel to the longitudinal axis of said coupling segment;

said opposite face of said bolting pad terminating adjacent said arcuate member in a recessed portion extending inwardly at an angle relative to said planar bolting face portion and towards the longitudinal axis of said coupling segment.

4,702,500

FIRE RESISTANT SEAL

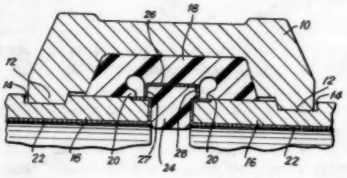
Lawrence W. Thau, Jr., Somerset, and Douglas R. Dole, Bridgewater Township, Somerset County, both of N.J., assignors to Victaulic Company of America, Easton, Pa.

Continuation-in-part of Ser. No. 812,136, Dec. 20, 1985, Pat. No. 4,643,461. This application Sep. 4, 1986, Ser. No. 903,663

The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.

Int. Cl.[4] F16L *17/06*

U.S. Cl. 285—112 **3 Claims**



1. A fail-safe fire retardant seal assembly for use in a segmented pipe-coupling of the type including plural coupling segments adapted to be secured in encircling relationship about the juxtaposed ends of pipes, and which provide an internal annular channel for the reception of said seal assembly, said seal assembly including:

an annular seal member formed from a thermally destructible elastomeric material, said seal member comprising an annular body having axially aligned sealing surfaces on an inner periphery thereof which seal against the outer circumferential surfaces of the ends of the pipes, with said

sealing surfaces defining a circumferentially extending slot in the inner periphery of said annular body;

a radial flange of said seal member extending radially inwardly of said annular body and located between said sealing surfaces; and

an annular ring of fire resistant material incorporated into said radial flange, said annular ring having axially spaced and radially inwardly extending legs for engagement with the outer circumferential surfaces of the respective pipes to be sealed, and defining a continuous cage in which the radially innermost portion of said radial flange is confined and protected against thermal destruction in the event of thermal destruction of the remainder of said seal member, said radially innermost portion of said flange being for engagement by the radial end faces of said pipes in sealing relationship therewith.

4,702,501

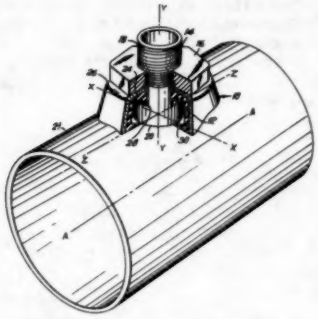
RETAINING COLLAR FOR AN ELASTOMERIC SEAL

William R. McLennan, Easton, Pa., assignor to Victaulic Company of America, Easton, Pa.

Filed Mar. 15, 1985, Ser. No. 712,564

Int. Cl.[4] F16L *41/00*

U.S. Cl. 285—197 **20 Claims**



1. A deformable retaining collar for confining and stressing an elastomeric seal of a plumbing branch fitting into seating and sealing contact with the outer surface of any of a plurality of cylindrical main pipes falling within a determined range of external diameters each of greater diameter than the diameter of a free edge of said collar, and into seating and sealing contact with a cylindrical portion of said fitting, comprising:

a thin-walled, cup-shaped annulus formed from a deformable material, including an annular portion, and a conical skirt integral with said annular portion and which is capable of flexure under axial loading of said annulus in a direction towards a free edge of said skirt;

said skirt being flared outwardly of the longitudinal axis of the annulus at an acute angle to said annulus;

said skirt, at least at its free edge, being resilient and deformable upon the application of stress thereto in the direction of the longitudinal axis of said annulus and towards said free edge, and being substantially devoid of edge reinforcement;

whereby, forcing said annulus axially of the cylindrical portion of said fitting and towards the longitudinal axis of said main pipe by means of an internally threaded member threaded onto an external thread of said cylindrical portion. will force said skirt into inital contact with the outer surface of said main pipe at locations spaced axially of said pipe exterior, and causing stressing of said skirt at diametrically opposite points on the free edge thereof, and subsequently will cause outward displacement and elongation of said skirt in the direction of said diametrically opposite points, and concomitant development of tensile hoop stresses in said skirt producing inward movement of said skirt towards said longitudinal axis of said annulus and a decrease in said angle subtended by said skirt relative to the longitudinal axis of said annulus at positions intermediate said diametrically opposite points to bring the entire free edge of said skirt into continuous line engagement with the outer surface of the associated said pipe.

4,702,502

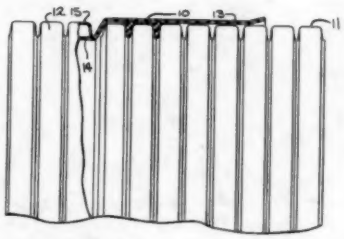
GASKET FOR MAKING JOINTS IN CORRUGATED PLASTIC PIPE

James W. Shade, Middletown, and Robert J. Higgs, Springboro, both of Ohio, assignors to Contech Construction Products Inc., Middletown, Ohio

Filed Aug. 6, 1985, Ser. No. 762,909

Int. Cl.[4] F16L *21/02*

U.S. Cl. 285—231 **18 Claims**



1. For use with a first pipe having a plurality of annular grooves and a second pipe, an elastomeric gasket for forming a seal in a telescopic joint between the first and second pipes comprising:

a sealing portion adapted to be disposed in one of the first pipe annular grooves and extend out of the one groove,

an anchoring portion adapted to be disposed in another of the first pipe annular grooves and extend out of the other groove, and

a portion connecting said sealing portion and said anchoring portion, said gasket for forming a seal as the pipes are telescoped to form a joint, said anchoring portion adapted to be trapped in the other groove of said first pipe thereby anchoring said sealing portion in the one groove of said first pipe for engagement and compression by the second pipe during telescoping of the pipes.

4,702,503

COUPLING BETWEEN AT LEAST TWO MEMBERS TO BE SUBJECTED TO HIGH THERMAL STRESS

Arwed von Koch, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed May 20, 1985, Ser. No. 735,579

Claims priority, application Fed. Rep. of Germany, May 18, 1984, 3418473

Int. Cl.[4] F16L *23/00*

U.S. Cl. 285—330 **31 Claims**

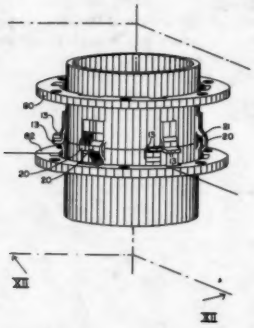
1. A coupling including first and second opposed members clamped to each other by a clamping means, each of said members having a contact surface for contacting one another, each of said members having a series of inner and outer centering elements for centering said members, each of said centering elements having only one centering surface extending outwardly relative to a central region of said member and transversely relative to said contact surface,

said inner centering elements of said first member being disposed inside said outer centering elements of said second member, said outer centering elements of said first

member being disposed outside said inner centering elements of said second member,

said centering surface of each said inner centering element of said first member being disposed to abut said centering surface of only one adjacently disposed inner centering element of said second member,

said centering surface of each said outer centering element of said first member being disposed to abut said centering surface of only one adjacently disposed outer centering element of said second member,



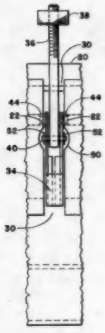
each of said centering elements having remaining transversely extending surfaces in addition to said centering transversely extending surface, said remaining transversely extending surfaces of one member being separated sufficiently in a radial and circumferential direction with respect to adjacent remaining transversely extending surface of the centering element of the other member to allow for expansion without deformation of said centering elements when said coupling is at a maximum operating temperature.

4,702,504

CONTAINER LATCH

Jack Brothers, Ft. Walton Beach, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 24, 1986, Ser. No. 889,650
Int. Cl.[4] E05C *5/00*
U.S. Cl. 292—66 **1 Claim**



1. A toggle latch assembly for releasably securing a cover to a container comprising:

a container having at least one extruded side member with an integral cavity of circular cross-section extending throughout the length of the interior thereof;

said side member having a slot cut at least part way therethrough and of sufficient depth to expose said cavity of circular cross-section and thereby establish a pair of holes at the opposed sides of said slot;

said side member having a preselected width and having a length substantially greater than said width such that plural slots may be cut therethrough;

a latch handle adapted to fit within said slot and having a pair of projections extending outwardly therefrom, each one of said pair of projections engaging one of said pair of holes to pivotally affix said latch handle to said side member; and

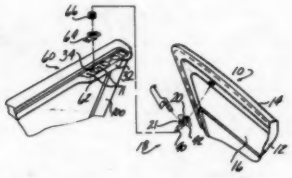
a drawbar pivotally affixed to said latch handle having means thereon for engaging a cover for said container wherein said pair of projections extending from said latch handle are tubular projections and wherein said side member is of sufficient width and said slot in said side member is of sufficient depth to permit the nesting of said latch handle entirely below the exposed surface of said side member.

4,702,505

CONVERTIBLE TOP LATCH MECHANISM

Michael P. Alexander, Grosse Ile, Mich., assignor to ASC Incorporated, Southgate, Mich.

Filed Sep. 6, 1984, Ser. No. 647,655
Int. Cl.[4] E05C *5/04*
U.S. Cl. 292—251 **8 Claims**



1. In a vehicle having a foldable vehicle rood assembly foldable over the stationary structure of the vehicle improvement comprising a latch mechanism for releasably latching the foldable roof assembly to the stationary structure of the vehicle, the latch mechanism comprising:

a helical projection mounted on the movable roof assembly of the vehicle;

a keeper mounted on the stationary structure of the vehicle for removably receiving the projection, the keeper comprising:

a bezel plate, the bezel plate having a central bore;

a lock ring movably mounted in the central bore of the bezel plate and mounted for axial movement with respect to the bezel plate in a plane normal to the bezel plate to afford vertical adjustment of the latch mechanism; and

means formed in the lock ring for releasably retaining the projection in the bezel plate.

4,702,506

MAGNET CATCHER FOR DOORS

Kyosuke Iimura, 1-2-13, Higashi-Tabata, Kita-ku, Tokyo, Japan

Filed Dec. 19, 1984, Ser. No. 683,652
Claims priority, application Japan, Jun. 29, 1984, 59-96740[U]; Aug. 24, 1984, 59-128277[U]; Oct. 30, 1984, 59-164437[U]; Nov. 14, 1984, 59-171741[U]
Int. Cl.[4] E05C *19/16*
U.S. Cl. 292—251.5 **3 Claims**

1. A magnet catcher for a door, comprising:

a case, and a movable body disposed inside said case in a

freely slideable manner; and a magnet having at least two opposed sides;

said movable body having a front end and a magnet housing; said magnet housing having an opening containing said magnet with said two opposed sides of said magnet being exposed;

said movable body and said case together supporting a yoke, said yoke being movable relative to said movable body and said case;

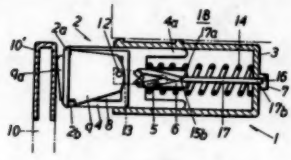
said yoke having a projecting front end;

said yoke including at least one yoke member disposed adjacent a first one of said at least two opposed sides of said magnet which are exposed by said opening; said yoke member having a rear portion; said rear portion of said yoke member having a projection thereon on a side of said yoke member which faces away from said first side of said magnet;

said case having a pair of sidewalls; a first one of said sidewalls having a recessed portion adapted to receive said projection of said yoke member; said first one of said sidewalls guiding movement of said movable body;

said recessed portion having a narrow end adapted to snugly receive said projection and a wide end;

slits disposed in said front end of said movable body adapted to receive said projecting front end of said yoke; said projecting front end of said yoke having a first position corresponding to a retracted position of said movable body within said case wherein said projecting front end is in contact with a magnetically attractable body along a



substantial portion of a perimetry of said projecting front end of said yoke; in a second position of said yoke, corresponding to an extended position of said movable body from within said case, an attracting surface of said projecting front end of said yoke in said second position being inclined relative to said first position of said yoke when said movable body is in said first position during attaching and detaching of said yoke to said magnetically attractable body; said projecting front end of said yoke being notched to have shoulders thereon, said projecting front end of said yoke being disposed within said slits;

a rod having a generally flat face disposed adjacent an end of said body, said generally flat face having an endless guide channel which engages with a pin;

said case having a spring engaging portion on a rear end thereof, so that said spring engaging portion engages with one end of said pin while another end of said pin is engaged within said endless guide channel of said generally flat face; a coil spring urging said movable body outward from said case;

during movement of said movable body from said first position to said second position, said projection on said yoke member being in said wider portion of said recess, thereby permitting tilting movement of said yoke relative to said movable body and to said case;

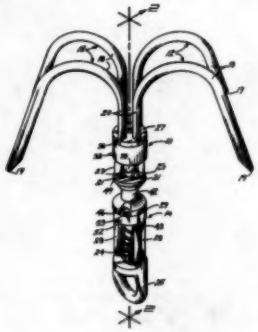
whereby opening of a door results in tilting of said yoke relative to said movable body to reduce magnetic contact area of said yoke relative to said magnetically attractable body.

4,702,507

LOCKING DEVICE FOR MULTIPLE PIVOTABLE MEMBERS

Richard L. Medendorp, P.O. Box 1951, Sandpoint, Id. 83864

Filed Aug. 28, 1986, Ser. No. 901,416
Int. Cl.[4] A01M *23/24*; B66C *1/10*
U.S. Cl. 294—66.1 **16 Claims**



1. A locking device, comprising:

a support having a central axis;

a plurality of members mounted to the support for individual pivotal movement about pivot axes spaced angularly about the central axis between operative and inoperative angular conditions and for selective axial movement in relation to the support along the central axis between locking and unlocking positions;

each of the members including a first locking surface thereon;

second locking surfaces positioned on the support for engagement with the first locking surfaces of the individual members at the locking positions thereof the selectively lock the members against individual pivotal movement from the operative angular conditions thereof; and

means for selectively locking the members axially with the first and second locking surfaces engaged.

4,702,508

LIFTING CLAMP CAM WEAR INDICATOR AND METHOD

Jerome Weiner, Teaneck, N.J., and Moon Choung, Bayside, N.Y., assignors to Cooper Industries, Houston, Tex.

Filed Oct. 10, 1986, Ser. No. 917,766
Int. Cl.[4] B66C *1/48*; G01D *21/00*
U.S. Cl. 294—101 **3 Claims**

1. A lifting clamp for lifting metal plates or other structural elements comprising:

a clamp housing including means forming a "U" shaped recess for receiving a portion of metal plate or other structural elements;

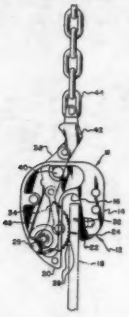
a plate gripping cam pivotally mounted within said clamp housing for movement into gripping engagements with said metal plate or other structural elements and for securing the metal plate or other structural elements to said clamp housing between said plate gripping cam and said clamp housing;

said plate gripping cam including a plurality of spaced apart rounded plate gripping teeth arranged along an arcuate rim of said plate gripping cam with respect to an axis of rotation of said plate gripping cam;

said spaced apart rounded plate gripping teeth including a crested edge extending generally in a plane parallel to said axis of rotation and at least selected ones of said teeth each having gauge marks formed in said crested edge which may be viewed from the exterior of said lifting clamp at

least when a metal plate or other structural element are not disposed in said "U" shaped recess;

said gauge marks providing means to determine tooth wear in a way such that as said teeth are worn such that said



crested edge is diminished the worn crested edge on said teeth will contact said gauge marks;

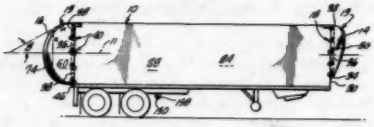
whereby an indication will be given that the plate gripping cam should be replaced.

4,702,509

LONG-HAUL VEHICLE STREAMLINE APPARATUS

Morris C. Elliott, Sr, 11723 Norino, Whittier, Calif. 90601

Filed May 27, 1986, Ser. No. 866,916
Int. Cl.[4] B62D *35/00*
U.S. Cl. 296—1 S **20 Claims**



1. Apparatus for streamlining a vehicle body having at least one end member having a face area comprising a substantially plane surface perpendicular to a travel axis of the vehicle, the apparatus comprising:

(a) attachment means ona perimeter of the face area of the end member of the vehicle, the attachment means comprising a plurality of plate members spaced along the perimeter of the face area;

(b) inflatable bag means located against the face area, the bag means having a smooth aerodynamic convex portion facing away from the face area, the bag means comprising:

(i) mounting means for supporting the bag means by the attachment means, the plate members of the attachment means extending toward the convex portion of the bag means the mounting means comprising a plurality of engagement members extending from the convex portion of the bag means, the engagement members being supported by the corresponding plate members;

(ii) fill means for admitting a pressurized gas into the bag means; and

(iii) blowdown means for deflating the bag means; and

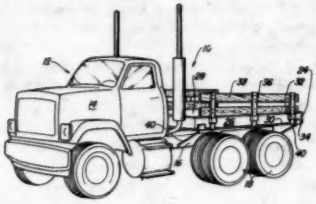
(c) coupling means for connecting the mounting means to the attachment means, the coupling means being locked when the bag means is inflated and releasable when the bag means is deflated, the coupling means comprising a hook member on each plate member and a pin member on each engagement member, the hook member preventing the pin member from moving away from the face area beyond a predetermined distance when the bag means is inflated, the hook member releasing the pin member when the bag means is deflated and the pin member is moved toward the face area.

4,702,510

DEMOUNTABLE FLAT BED FOR A FIFTH WHEEL TRACTOR

Danny J. Davis, 5450 Johnson St., Merrillville, Ind. 46410

Filed Feb. 20, 1987, Ser. No. 17,243
Int. Cl.[4] B62D *23/00*
U.S. Cl. 296—35.3 **14 Claims**



1. A demountable flat bed for use with a conventional tractor having a chassis and a standard fifth wheel assembly mounted on the chassis, said flat bed comprising:

a substantially planar, rectangular bed having a pair of sides, a pair of ends, an upper surface and a lower surface;

a kingpin disposed in a central region of said lower surface and depending therefrom, said kingpin having a reduced diameter portion for demountable engagement with the fifth wheel assembly; and

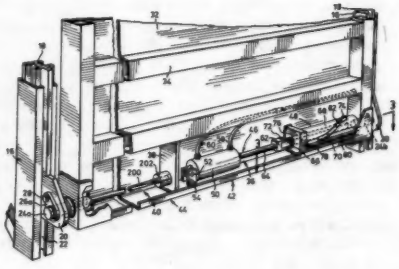
means for securing said bed to the chassis against rocking and pivoting motion, said means for securing comprising at least four attachment points, two associated with each side of the bed, one near each end and fastening means extending from each attachment point to the chassis.

4,702,511

TAILGATE CLOSURE MECHANISM

Richard C. Olins, Toronto, Canada, assignor to Diesel Equipment Limited, Toronto, Canada

Continuation-in-part of Ser. No. 820,118, Jan. 21, 1986, abandoned. This application Jan. 12, 1987, Ser. No. 2,384
Int. Cl.[4] B60P *1/26*
U.S. Cl. 296—57 R **7 Claims**



1. In a tailgate assembly of a truck or the like in which the tailgate is mounted for pivotal movement with respect to a support frame about a first axis, between an open position in which the tailgate is horizontally disposed and a closed position in which the tailgate is an upright position, the improvement of a powered closure mechanism for moving the tailgate from the opened position to the closed position comprising;

(a) first and second complimentary cam members adapted to interact with one another such that longitudinal movement of said first cam member causes rotational movement of said first cam member with respect to said second cam member, said cam members being mounted for rotation of said first cam member about said first axis, said first cam member being fast with respect to said tailgate and said second cam member being fast with respect to said frame,

(b) drive means mounted on said tailgate for driving said first cam member longitudinally with respect to said second cam member to cause rotation of said first cam member and thereby cause rotation of said tailgate with respect to said frame between said opened position and said closed position.

4,702,512

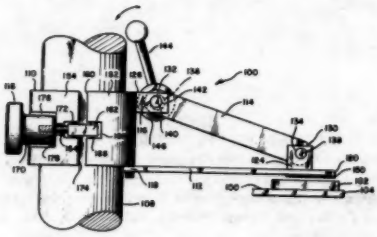
ADJUSTABLE WORKPIECE SECURING DEVICE

Patrick C. Nocera, 719 Van Buren Ave., Elizabeth, N.J. 07201

Filed Aug. 14, 1986, Ser. No. 896,841

Int. Cl.[4] B25B *1/00*

U.S. Cl. 269—77 **19 Claims**



1. A device for securing a workpiece to a support having a column member, said device comprising a locking assembly securable to a portion of said column member, a first member having a secured end fixedly attached to said locking assembly to prevent relative movement therebetween and a displaceable end adapted for engaging said workpiece upon displacement thereof, a second member having a first end coupled to said first member adjacent said displaceable end and a second end coupled to said locking assembly, and cam means in operative association with said second member for displacing said second member and said displaceable end of said first member while said secured end thereof remains stationary, whereby said displaceable end of said first member is brought into engagement with said workpiece for securing said workpiece to said support.

4,702,513

BRACKET FOR SUN VISOR FOR AUTOMOTIVE VEHICLES WITH MEANS FOR EXCLUDING MOLDING FOAM

Charles Ebert; Jean L. Delcroix, Luxeuil; Roland Majchrzak, Yutz, all of France, and Lothar Viertel, Berus Uberherrn, Fed. Rep. of Germany, assignors to Gebr. Happich GmbH, Fed. Rep. of Germany

Filed Jun. 17, 1985, Ser. No. 745,852

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1984, 3440976

Int. Cl.[4] B60J *3/02*

U.S. Cl. 296—97 H **14 Claims**

1. A sun visor for automotive vehicles, comprising:

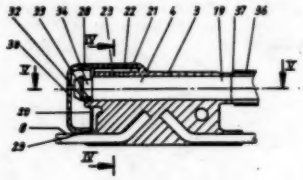
a sun-visor body;

a mounting bracket attached to the sun-visor body, the mounting bracket defining a mounting borehole for supporting a shaft therein, the mounting borehole having a first opening through which the shaft is inserted into the borehole and a second opening into the borehole;

a spring which fits into the mounting borehole through the second opening and is located adjacent thereto, the spring having a shape and orientation within the mounting borehole which permits it to clamp the shaft within the body of the spring;

a cover for enclosing the second opening, whereby the second opening is effectively covered against entry of material through the second opening;

the second opening being axially aligned with the borehole



and in which the cover is a cap which is attached to the bracket at the second opening;

the cap being cup-shaped, the sun visor further including means for securing the cap to the mounting bracket;

the securing means comprising a circumferential bead formed on the peripheral edge of the cap and a complementary circumferential groove defined in the mounting bracket adjacent the second opening, the bead snappingly engaging the groove.

4,702,514

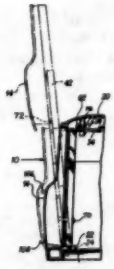
SLIDING DOOR

Arthur H. Perry, 652 School St., Kohler, Wis. 53044

Filed Apr. 15, 1986, Ser. No. 852,183

Int. Cl.[4] E05D *15/10, 15/58*

U.S. Cl. 296—146 **3 Claims**



1. A vertically operable vehicle door assembly for a vehicle comprising a frame attached to the vehicle,

support members pivotally attached to the frame, the support members having a first set of racks to permit the support members to move,

horizontal rack means attached proximate a top of the support members and the vehicle for moving the support members out and away from the vehicle,

a box frame enclosing the suport members,

pinions mounted in the box frame for engaging with the first set of racks to permit vertical movement of the box frame along the support members,

a second set of racks in the box frame to allow further upward movement of the box frame,

a door, and

pinions attached to the door to engage the second set of

racks to permit vertical movement of the door with respect to the box frame.

4,702,515

SIDE MEMBER OF MOTOR VEHICLE

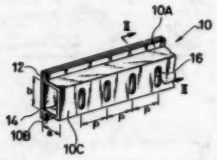
Hisaaki Kato; Shuuji Yamaguchi, both of Susono, and Toshiharu Okazaki, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jun. 13, 1986, Ser. No. 874,052

Claims priority, application Japan, Jun. 17, 1985, 60-131352

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—189 **18 Claims**



1. A side member of a motor vehicle, said side member being disposed substantially horizontally in the longitudinal direction of a vehicle body, comprising:

first, second, third and fourth side walls defining a tetragonal closed section in a vertical section of the vehicle body;

a plurality of beads on at least one of said side walls, each of said beads extending in a transverse direction to said longitudinal direction and being shorter than the width of said at least one side wall in said transverse direction and not extending to corners defined by said at least one side wall and side walls adjacent to said at least one side wall, said beads being spaced at a pitch of $P=(a+b)\times(1\pm0.1)/2$ where b is the transverse length of said at least one side wall and a is the transverse length of said adjacent side walls.

4,702,516

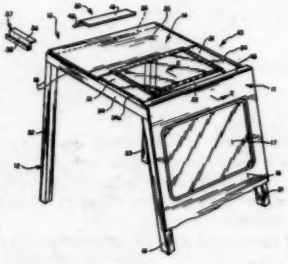
CAB CONSTRUCTION

Robert P. Martin, Jr., c/o Martin Sheet Metal, Inc. 7108 Madison Ave., Cleveland, Ohio 44107

Filed Jan. 22, 1986, Ser. No. 821,278

Int. Cl.[4] L02F *3/62*; B62D *23/00*

U.S. Cl. 296—190 **3 Claims**



1. A cab for a vehicle or like equipment comprising a framework of elongated frame elements, including at least two frame elements adjacent opposed sides of the framework extending generally parallel to a first direction and having flat coplanar faces of predetermined substantially equal width, a set of four cover plates attached to the framework, the cover plates including three generally rectangular plates arranged in a U-shaped pattern with the plates forming the sides of the U each overlying one of the flat faces of the framework and extending along the opposite ends of the plate forming the bight of the U, the fourth cover plate extending between the flat faces of the framework and along the ends of the side plates remote from the end plate to close the U-shaped pattern into a rectangular window aperture, a rectangular transparent pane glazed on said window aperture, one dimension of said pane generally corresponding to the length of said bight plate and the other dimension generally corresponding to the length of the side plates less the width of said bight plate along which the side plates extend, the arrangement of the plates allowing a single size pane and a single size bight plate to be used on the cab regardless of its actual width by appropriate selection of the width of the side plates from fixed size increments.

4,702,517

DETACHABLE-TYPE VEHICLE SUN SHADE

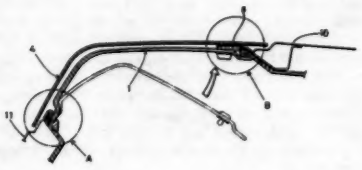
Yoshihiko Maeda; Toshiaki Nogami; Shigeru Kashiwagi, all of Kariya; Kenji Sakurai, Toyota, and Kunio Nishiyama, Okazaki, all of Japan, assignors to Toyota Shatai Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Banchi, both of, Japan

Filed Jul. 23, 1986, Ser. No. 888,207

Claims priority, application Japan, Jul. 31, 1985, 60-117548[U]

Int. Cl.[4] B60J *7/11, 7/19, 7/195*

U.S. Cl. 296—214 **4 Claims**



1. A detachable-type vehicle sun shade apparatus for use in vehicles having glass sun roofs installed between a center roof material and an exterior panel both of which define an opening having a flange mounted trim strip therearound, the sun shade apparatus comprising:

a holder mounted along a first edge of the opening,

a sun shade having a first edge receivable between said holder and the trim strip along the first edge of the opening, and a second edge,

a stopper rotatably mounted on said sun shade adjacent said second edge of said sun shade, said stopper including edge engaging means for engaging the trim strip along a second edge of the opening which is adjacent said second edge of said sun shade and knob means for rotating said stopper and bringing said edge engaging means into engagement with the trim strip along the second edge of the opening, said second edge of said sun shade being pressed against the trim strip along the second edge of the opening when the stopper is rotated to a position where the edge engaging means engages the trim strip along the second edge of the opening.

4,702,518

SLIDING AND LIFTING VEHICLE ROOF WITH A SLIDING CANOPY PROVIDED WITH FLEXIBLE SCREENS

Jochen Paerisch, Herrenberg; Werner Herlemann; Gerhard Sweigart, both of Aidlingen; Hans Jardin, Inning/Ammersee, and Alfons Lutz, Emmering, all of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Gauting and Daimler-Benz Aktiengesellschaft, Stuttgart, both of, Fed. Rep. of Germany

Filed Nov. 21, 1985, Ser. No. 800,551

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1984, 3442617

Int. Cl.⁴ B60J *7/22, 7/05*

U.S. Cl. 296—217 **18 Claims**

13. Sliding and lifting roof for vehicles with a cover for closing an opening in a fixed roof surface in a closed position thereof, said cover being slectively liftable by raising of its rear edge above the fixed roof and rearwardly slidable after lowering of its rear edge below the fixed roof surface, and a slidable cover liner panel situated below the cover, said liner panel being liftable, at least in part, jointly with said cover, wherein a flexible screen is provided between each of longitudinally extending lateral edges of the slidable liner panel and a guide part for the liner panel that participates in the sliding movement but is prevented from participating in the lifting movement of the cover, each said flexible screen being guided over a respective lateral edge of the part of the liner panel which may be lifted, and a tensioning arrangement is provided for holding each flexible screen taut in every position of the liftable part of the sliding liner panel, wherein said tensioning arrangement comprises a strip of spring wire having a leg that is substantially straight and oriented generally longitudinally, each said flexible screen being secured at one longitudinal edge directly upon said leg in a manner resiliently tensioning the spring wire strip, wherein said strip is resiliently deflectable due to increases and decreases of said tensioning so as to cause said leg to swing toward and away from a lateral edge of the liftable part of the liner panel as said liftable part of the liner panel is raised and lowered.

4,702,519

VANITY MIRROR

Mark Lobanoff, Troy, Mich., assignor to Irvin Industries, Inc., Rochester Hills, Mich.

Continuation of Ser. No. 746,676, Jun. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 627,280, Jul. 2, 1984, abandoned. This application Jul. 14, 1986, Ser. No. 885,330

Int. Cl.⁴ A47C *7/62*

U.S. Cl. 297—185 **12 Claims**

1. A seat assembly, comprising in combination:

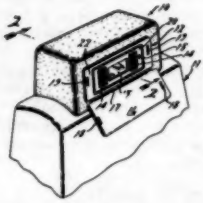
(a) a vehicle seat including a head restraint having front and rear sides, said head restraint further including energy-absorbing means for sustaining loads imposed thereon;

(b) head restraint mounting means for interconnecting said head restraint with said seat;

(c) a light disposed on the rear side of said head restraint;

(d) a mirror pivotally disposed on the rear side of said head restraint, said light and said mirror being interconnected with one another as a mirror-and-light assembly, said mirror-and-light assembly being pivotally interconnected with said rear side of said head restraint for pivotal movement relative thereto about a first axis, said mirror-and-light assembly being pivotally movable to a plurality of pivoted positions relative to said head restraint, and said mirror-and-light assembly being positioned on said head restraint with said energy-absorbing means between said front side of said head restraint and said mirror-and-light assembly;

(e) a cover for said mirror-and-light assembly; and



(f) means interconnecting said cover with said head restraint for pivotal movement of said cover relative to said head restraint about a second axis between a first closed position substantially covering said mirror-and-light assembly and a second open position wherein said mirror-and-light assembly are substantially exposed.

4,702,520

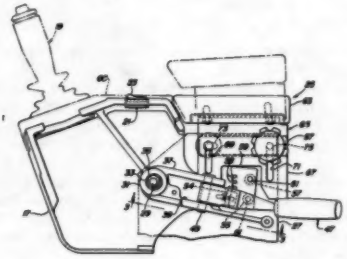
ADJUSTABLE ARMREST WITH INTEGRAL VEHICLE CONTROLS

Edwin L. Whisler, Peosta; Frederick D. Griswold, Jr., and Stuart L. Neagle, both of Dubuque, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Oct. 12, 1984, Ser. No. 660,209

Int. Cl.⁴ B60N *1/06*

U.S. Cl. 297—417 **8 Claims**



1. In an operator's support for a movable machine including a seat support, supporting a horizontally extending seat surface and back resting means for limiting rearward motion of an operator seated on said seat surface, and an armrest laterally offset form said seat surface and upwardly projecting beyond the same, wherein an improved armrest comprising:

a support plate fixably mounted to said seat support positioned lateral to said seat surface and extending vertically;

a forward section pivotably mounted to said support plate including a hand controlled lever assembly fixably mounted to said forward section's top surface and first means for pivotally and selectively positioning said forward section within a defined arc;

a rearward section adjustably mounted to said support plate including a second means for adjustably mounting said rear section to said support plate such that said rear sections angle of incline and vertical position can be selectively adjusted to a complimentary, generally linear alignment to said top surface of said forward section,

said second means being comprised of a cushion support plate having a generally horizotally extending cushion

fixably mounted atop thereto, said cushion support plate having a vertically, downward extending portion, said portion having a first and second vertically extending slot in opposite and generally parallel spaced apart relationship;

said support plate having a forwardly located horizontal slot and a rearwardly located aperture;

a bolt, having a bolt head, extending through said first slot in said cushion support plate cushion portion and said horizontal slot in said support plate and is secured therein by a nut;

a friction washer placed around said bolt and between said cushion support plate portion and said support plate; and

a knob having a threaded stem extending through said second vertical slot in said cushion support plate portion and said aperture in said support plate secured there by a nut.

4,702,521

ASSEMBLED CHAIR OR FLOWERPOT HOLDER

Deung Bae, Sudaemun-Ku, Seoul, Rep. of Korea

Filed Jun. 25, 1986, Ser. No. 878,338

Claims priority, application Rep. of Korea, Jun. 27, 1985, 7781/1985

Int. Cl.[4] **A47C** *7/00*

U.S. Cl. 297—440 **6 Claims**

1. An assembled chair made of three components which comprises:

a right side component portion formed of a plurality of fingers having slots therebetween, said fingers forming a portion of the chair seat and extending within S-shaped configuration into leg portions disposed at the lower end thereof,

a left side component portion formed as a mirror image of the right side component portion whereby the fingers of one of said components slidably engages within the slots of the other component forming a completely assembled chair seat, and

a back component portion for attachment to said chair seat, said back component portion comprising a back support portion which extends in a first direction substantially vertically from the chair seat and lateral seat support portions which extends in a second direction from the back to the front of the seat where they fixedly engage the upper front portion of the leg members.

4,702,522

SEAT ASSEMBLY WITH FOAM ENCAPSULATED LOAD-SUPPORTING FIBROUS MATRIX

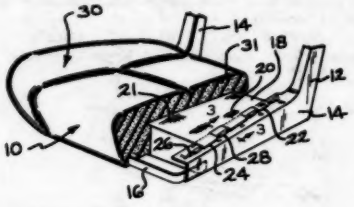
Curtis F. Vail, Ann Arbor, Mich., and Duane W. Witzke, Logan, Ohio, assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Oct. 29, 1982, Ser. No. 437,715

Int. Cl.[4] **A47C** *7/18*

U.S. Cl. 297—452 **4 Claims**

1. In a vehicle seat assembly for carrying downwardly directed seating loads, a main frame having laterally separated side rails and a front rail, a load supporting fabric sheet having side edges fixed to said side rails and having front and rear edges which are not directly coupled to said main frame, said fabric sheet formed of elastic woven filaments and being normally maintained in a tensioned condition by said side rails, said sheet being supported in a generally horizontal position on said side rails so that at least some of said filaments extend side-to-side in said seat assembly between said side rails and are coupled at both their ends to said side rails, said sheet being able to transfer seating loads to said side rails, a foam body molded in place on said frame so as to substantially encapsulate



said rails and said sheet, said sheet being substantially encapsulated in said body in a position forming a support for a portion of said body which constitutes the seat cushion and carries the downwardly directed seating loads, said foam body acting to hold said filaments in fixed relative positons in which said filaments and said foam body cooperate in providing a response to the seating loads.

4,702,523

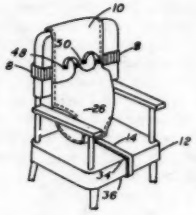
HARNESS FOR RESTRAINING A CHILD

Jennifer R. Schrader, 67 Orchard La., and Harry Geisen, 66 N. Hill Dr., both of New Albany, Ind. 47150

Filed Nov. 6, 1986, Ser. No. 927,604

Int. Cl.[4] **A47C** *31/00;* **A47D** *13/08*

U.S. Cl. 297—485 **4 Claims**

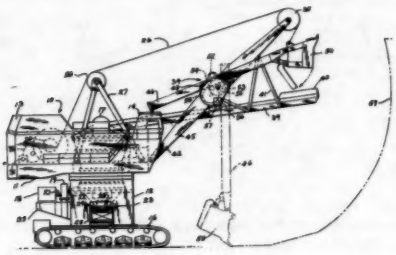


1. A harness for restraining a child in a seated position in a high chair, stroller, or jumper chair; said harness comprising a chair engaging pouch with partially closed sides, said pouch formed by a front panel folded rearwardly over the chair back and joined briefly on each side by connecting means, said front panel of the pouch extending downwardly and narrowing to form a crotch section suitably anchored to the chair by an attached crotch strap passing through either of two horizontal loops of flexible material rearwardly of the crotch strap anchoring point, said crotch strap then passing forwardly to front edge of chair seat, then downwardly and rearwardly encircling said chair seat to a detachably connectible means at said pouch back panel, said loops providing adjustability for varying occupant size; said crotch panel then widening and extending upwardly with lateral flaps on each side connecting with the front panel of the pouch forming the child containing section, the front of said child containing section extending upwardly forming a bib panel with detachably connectible restrictive straps at said bib panel's upper extremities, said restrictive straps passing rearwardly over the child's shoulders to adjacent anchoring points in said pouch front panel.

4,702,524
CONTINUOUS MINING MACHINE

Phillip W. Mork, Mukwonago; Melvin W. Kraschnewski, Racine, and Carl D. Gilmore, South Milwaukee, all of Wis., assignors to Becor Western Inc., South Milwaukee, Wis.

Filed Jul. 18, 1986, Ser. No. 886,890
Int. Cl.⁴ E21C *47/00*; B66B *17/00*
U.S. Cl. 299—64 **8 Claims**



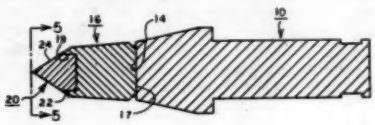
1. A continuous mining machine comprising:
a movable frame;
a crusher mechanism operatively supported on the frame;
an unloading conveyor mounted on the frame to transport material from the crusher mechanism;
a housing rotatably supported on the frame about the crusher mechanism;
a loading conveyor means to deliver material to said crusher mechanism;
an excavating dipper mechanism to deliver material to said loading conveyor means; and
said loading conveyor means and said excavating dipper mechanism being both mounted on said housing for rotation relative to the crusher mechanism, the weight of said crusher mechanism stabilizing the frame with respect to the loading conveyor means and the excavating dipper mechanism.

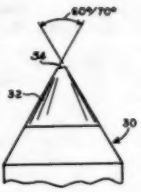
4,702,525
CONICAL BIT

Phillip A. Sollami, 1300 E. Pine, and Jimmie L. Sollami, 8400 S. 84th Ct., both of Herrin, Ill. 62948

Continuation-in-part of Ser. No. 721,047, Apr. 8, 1985, abandoned. This application Mar. 17, 1986, Ser. No. 840,216
Int. Cl.⁴ E21C *35/18*
U.S. Cl. 299—79 **8 Claims**

1. A bit for mining coal, said bit being of the type wherein said bit is adapted to be forced into the exposed surface of the coal being mined, comprising
an elongated metal base having a first end portion adapted to be rotatably mounted to a mining machine and having a second end portion,
said second end portion being frustoconical and having therein a cylindrical hole extending along the longitudinal axis of said base,
a tungsten carbide percussion tip having a cylindrical end portion, said end portion being disposed in said hole and affixed to said base,
the portion of said tip extending from said base having a generally frustoconical surface and extending axially from said second end portion of said base, and
said tip having at the end thereof opposite said cylindrical end portion an elongated flattened surface which is delineated by said generally frustoconical surface and which is



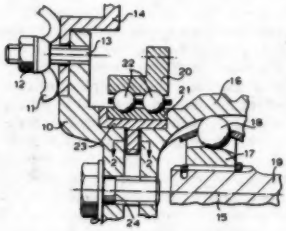


elongated in a direction transverse to the principal longitudinal axis of said bit.

4,702,526
HUB ASSEMBLY

Ivor G. Sankey, Sutton Coldfield, England, assignor to Hardy Spicer Limited, Birmingham, England

PCT No. PCT/GB85/00336, § 371 Date Mar. 17, 1986, § 102(e) Date Mar. 17, 1986, PCT Pub. No. WO86/01160, PCT Pub. Date Feb. 27, 1986
PCT Filed Jul. 29, 1885, Ser. No. 845,690
Claims priority, application United Kingdom, Aug. 2, 1984, 8419783
Int. Cl.⁴ B60C *23/18*; B60B *35/14, 27/00*
U.S. Cl. 301—6 WB **3 Claims**



2. A hub assembly for a drivable wheel of a motor vehicle, comprising:
a hub member;
a brake member secured to said hub member;
means for securing a wheel to said hub member;
bearing means providing an axis of rotation and comprising an outer race having means for connecting it to a vehicle suspension component, an inner race and rolling bearing elements between said outer and inner races;
a constant velocity ratio universal joint comprising inner and outer members and means for torque transmission between said members and for permitting relative articulation therebetween;
said hub member and said one joint member having surfaces facing one another along said axis and each having axially extending formations interfitting with the formation on the other member;

an element of a rigid thermally insulating material havng a portion interposed between said surfaces and said interfitting formations and a portion having an outwardly facing circumferential surface on which said inner bearing race is received, whereby both said joint member and inner bearing race are insulated from said hub member; and

fastening means holding said hub member and one joint member together with said element of thermally insulating material therebetween.

4,702,527

BUILT-UP WHEEL FOR VEHICLES

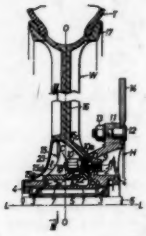
Akio Kawano, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1985, Ser. No. 714,193

Claims priority, application Japan, Mar. 21, 1984, 59-53750; Jul. 17, 1984, 59-148239

Int. Cl.[4] B60B *1/14, 5/02*

U.S. Cl. 301—9 DN **30 Claims**



1. A built-up wheel for vehicles, comprising a hub, a wheel body formed separately from said hub, and fastener means for detachably connecting said hub and said wheel body with each other, wherein said hub is provided with a bearng cylinder and a wheel support member formed integrally with and extending from said bearing cylinder whereas said wheel body is provided at an outer circumferential portion thereof with a rim on which a tire is to be set, and at an inner circumferential portion thereof with a boss which is connected with said wheel support member by said fastener means, said boss being provided with a inner cylindrical portion formed integrally therewith, said inner cylindrical portion being fitted around an outer circumferential portion of said bearing cylinder and extending in an axial direction of the bearing cylinder, said boss comprising a joint member attached to said wheel support member of said hub by said fastener means, said inner cylindrical portion formed integrally with said joint member and extending from an inner circumferential portion thereof, an outer cylindrical portion formed integrally with said joint member and extending axially from an outer circumferential portion of said joint member, radially extending reinforcing ribs for connecting and reinforcing said inner and outer cylindrical portions.

4,702,528

RESIN-AUGMENTATION OF PIN-ASSEMBLY FOR EXTRUDED, ANODIZED WHEEL RIMS

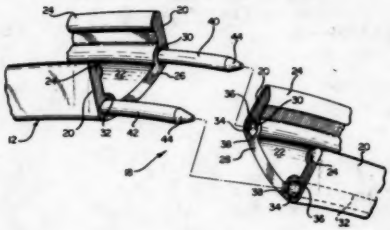
Martin B. Sacks, Claypool, Ind., assignor to Sun Metal Products, Inc., Warsaw, Ind.

Filed May 20, 1985, Ser. No. 735,594

Int. Cl.[4] B60B *21/02*

U.S. Cl. 301—99 **5 Claims**

1. In a circular wheel rim having confronting end faces and aligned tubulations extending away from said faces with pin means force-fit into said tubulations, said tubulations being of matching, non-round cross-section including a generally circular mid-portion defining a bore snugly receiving a said pin means and including at least one apical portion open to said mid-portion and extending radially outwardly of said mid-portion to define a channel open longitudinally to the side surface of said pin means, the improvement comprising: first ploymeric resin means cured in said channel and adhesively attached to the walls of said channel and to the confronting side surface of said pin means; and second and third polymeric resin means



cured in said tubulation at the respective ends of said pin means and adhesively attached to the walls of said tubulation and to the respective ends of said pin means; said resin means forming a fluid seal in said tubulation preventing migration of fluids into said tubulation.

4,702,529

VEHICLE BRAKE PRESSURE PROPORTIONING VALVE

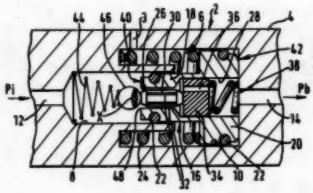
André Tobiasz, Epinay-sur-Seine, France, assignor to Automotive Products plc, Leamington Spa, England

Filed Jun. 9, 1986, Ser. No. 872,018

Claims priority, application France, Jun. 7, 1985, 85 08679

Int. Cl.[4] B60T *8/26*

U.S. Cl. 303—6 C **11 Claims**



1. A vehicle brake pressure proportioning valve comprising a housing, said housing having an inlet port for connection to a driver-controlled source of fluid pressure, said housing having an outlet port for connection to one or more brakes of the vehicle, said housing being formed with a housing bore having a first bore portion and a second bore portion of greater diameter than the first bore portion, a proportioning valve plunger having a first plunger portion slidable in the first bore portion and a second plunger portion slidable in the second bore portion, the second plunger portion being of greater diamenter than the first plunger portion, said plunger having on the first plunger portion a relatively small piston area and on the second plunger portion a relatively large piston area, said relatively small piston area being subject to inlet pressure from the inlet port and said relatively large piston area being subject to brake pressure at the outlet port, first resilient means applying a biasing load to the plunger in a direction opposing movement of the plunger under action of brake pressure, the plunger having a plunger bore for communicating the inlet port with the outlet port through the plunger, metering valve means comprising a valve member and a valve seat on the plunger, said valve member and plunger being arranged for movement one relative to the other for seating the valve member against the valve seat to close the plunger bore and for unseating the valve member to open the plunger bore, second resilient means

for opposing seating of the valve member, said valve member being subject to inlet pressure which in the valve closed position acts on the valve member in opposition to the combined action of the second resilient means and brake pressure acting in an unseating direction on said valve member, and wherein under increasing inlet port pressure the plunger is movable against the biasing load to bring the metering valve means into an operating state in which the plunger shuttles to and fro with further increasing inlet pressure whereby relative movement between the plunger and the valve member successively closes and opens the metering valve means to allow metered flow through the metering valve means for increasing the brake pressure at a reduced rate, and wherein upon the inlet pressure increasing to a first predetermined value at which the brake pressure is at a lesser second predetermined value the force of the inlet pressure acting on the valve member exceeds the combined opposing force of the second resilient means and brake pressure acting on said valve member whereby the metering valve means is held closed to prevent further increase in brake pressure above substantially the second predetermined value as the inlet pressure increases above the first predetermined value.

4,702,530

HYDRAULIC BRAKE SYSTEM WITH FAST-FILL CYLINDER

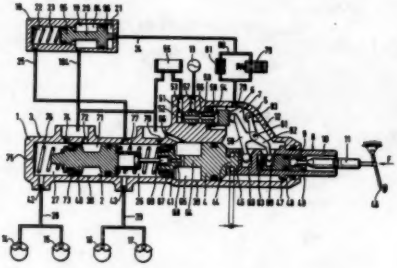
Juan Belart, Walldorf; Jochen Burgdorf, Offenbach-Rumpenheim, and Wolfram Seibert, Darmstadt, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 28, 1986, Ser. No. 834,753

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507488; Mar. 2, 1985, 3507484

Int. Cl.[4] B60T *11/08, 13/14;* **F15B** *7/04, 9/12*

U.S. Cl. 303—10 **3 Claims**



1. A hydraulic brake system for use with automobiles having vehicle wheels and wheel brakes, said system comprising, in combination:

a pedal-actuated hydraulic pressure generator including a hydraulic brake booster having a brake booster housing forming a booster chamber therein, and said generator including a master cylinder having at least one working chamber therein in which a piston is slidably mounted and said generator including a piston rod slidably mounted therein for connecting the master cylinder to a brake pedal;

a first pressure fluid conduit connecting said working chamber to said wheel brakes;

an auxiliary-pressure supply source connected to an input port of said housing;

a brake valve mounted in said housing between said input port and said booster chamber and said brake valve being responsive to movement of said piston rod to provide a pressure fluid connection between said input port of said housing and said booster chamber;

a fast-fill cylinder having a stepped bore therein providing a filling chamber and a pressure chamber therein wherein the cross-sectional area of said pressure chamber is greater than the cross-sectional area of said filling chamber, and said fast-fill cylinder including a two-stage piston slidably mounted therein with the opposite ends of said two-stage piston having dimensions corresponding to the cross-sectional area of the filling and pressure chamber and said two-stage piston being resiliently urged toward said pressure chamber;

a second pressure fluid conduit connecting said filling chamber to said wheel brakes;

a third pressure fluid conduit connecting said pressure chamber to said booster chamber;

wherein during normal braking operation of said brake system the pressure supplied by said auxiliary-pressure source translates said two-stage piston toward said filling chamber thereby applying the resulting pressure in said filling chamber to said wheel brakes; and,

wherein upon the pressure developed in said booster chamber falling below a predetermined pressure level, said two-stage piston is translated away from said filling chamber.

4,702,531

METHOD FOR THE CONTROL OF A SLIP-CONTROLLED BRAKE SYSTEM AND DEVICE FOR IMPLEMENTING THE METHOD

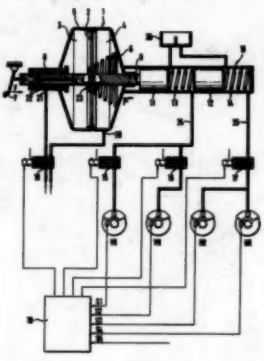
Dieter Kircher, Frankfurt am Main; Hubertus von Gruenberg, Kronberg, and Klaus D. Blum, Kelkheim, all of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Continuation of Ser. No. 609,573, May 11, 1984, abandoned. This application Jan. 28, 1987, Ser. No. 9,012

Claims priority, application Fed. Rep. of Germany, May 14, 1983, 3317629

Int. Cl.[4] B60T *8/44, 8/36;* **F15B** *7/00*

U.S. Cl. 303—114 **1 Claim**



1. A method for the control of a brake-slip-controlled brake system for automotive vehicles having wheels, particularly for road vehicles, wherein a pedal force is transmitted to a master cylinder assisted by an auxiliary force, said auxiliary force being created by an differential of pressures acting on opposite sides of a piston-like means, and then said pedal and auxiliary forces are combined and transmitted to a plurality of wheel brake cylinders via several pressure-fluid paths which are each adapted to be closed independently of one another, and wherein each wheel's rotational behavior and vehicle velocity are measured by independent sensors, signals obtained thereby are combined, processed and evaluated at a single master station to generate logical control signals in response to a control action corresponding to a detection of a start of a locked condition at any of the independent wheel sensors, the braking pressure at said individual wheels varying in response to the

wheel rotational behavior, said method comprising the steps of:

temporarily compensating the pedal force that is being assisted by the auxiliary force and applied to a said master cylinder (10 10', 33) by modifying said auxiliary force by reversing the differential in pressures to the opposite sides of said piston-like means to produce an opposed force,

reducing pressure in the master cylinder (10, 10' 33) and maintaining constant braking pressure at selected wheels in response to said sensor signals during the pressure reduction in the master cylinder, depending upon individual measured wheel rotational behavior,

regulating a fluid flow through one of said several pressure fluid paths leading to an individual wheel brake cylinder and to the master cylinder also in response to said sensor signals for reducing brake fluid pressure in the master cylinder;

intermittently closing the pressure-fluid paths (24, 24', 25, 25') from said master cylinder to each of the wheel brake cylinders of said selected wheels independent of the opposed force applied to compensate the pedal force in a pulse frequency responsive to the sensed instantaneous rotational characteristics of the wheel.

4,702,532

HYDRAULIC ANTI-SKID BRAKING SYSTEMS FOR VEHICLES

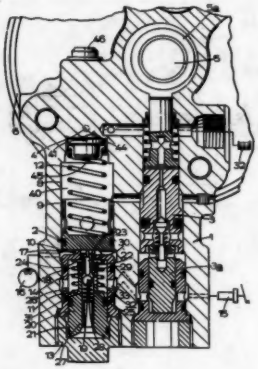
Robert A. Anderson, Solihull, England, assignor to Lucas Industries Public Limited Company, England

Filed Mar. 3, 1986, Ser. No. 835,472

Claims priority, application United Kingdom, Mar. 23, 1985, 8507620

Int. Cl.[4] B60T *8/42*; F16K *1/00*

U.S. Cl. 303—115 **6 Claims**



1. An hydraulic anti-skid braking system for vehicles comprising a vehicle brake, a supply for operating fluid for applying said brake, skid sensing means for sensing the pressure of skid conditions at said wheel during braking and thereupon to produce skid signals, a modulator assembly for modulating the supply of fluid from said supply to said brake in accordance with said skid signals, and an hydraulic pump for controlling brake re-application following correction of said skid, said pump incorporating at least one plunger and a working chamber associated with said plunger and in communication with said modulator assembly, wherein said modulator assembly comprises a housing having a bore, a de-boost piston working in said bore and movable between an advanced inoperative position and a retracted position, a control valve assembly with which said de-boost piston is adapted to co-operate and which is adapted to control communication between said brake and said supply, said control valve assembly being movable between an open position when said de-boost piston is in said advanced position and a closed position when said de-boost piston is in said retracted position, means defining a space in said bore in communication with said working chamber and in which fluid from said pump is adapted to be trapped to hold said de-boost piston in said inoperative advanced position, a bleed device communicating with said space and movable between an open position and a closed position, friction means for holding said bleed device in said open position during initial bleeding of said system, and pressure responsive means co-operating with said bleed device and responsive to fluid pressure in said system, said pressure-responsive means being adapted to overcome said friction means automatically to urge said bleed device into said closed position when said fluid pressure attains a predetermined value, and wherein said friction means comprises a pressure-responsive detent, and said pressure-responsive means comprises a pressure-responsive face on said detent which is responsive to pressure in the said space in communication with said working chamber, said detent being movable between an initial advance position to hold said bleed device in the open position and an inoperative retracted position which permits said bleed device to close automatically when the said pressure acting on said face attains the said predetermined value, means defining frictional engagement between said detent and said housing operative to hold said detent in said initial advanced position, said frictional engagements being overcome by a force to which said detent is subjected, which force comprises said pressure acting on said pressure-responsive face on said detent.

4,702,533

METHOD AND DEVICE FOR STORING FLAT RECORDING MEDIA

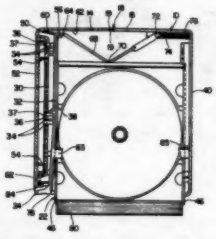
Josef Seifert, Grosselfingen, Fed. Rep. of Germany, assignor to Kurz Kunstoffe GmbH, Haigerloch, Fed. Rep. of Germany

Filed Apr. 16, 1986, Ser. No. 852,648

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513606

Int. Cl.[4] A47B *81/06*

U.S. Cl. 312—12 **9 Claims**



1. A system for storing flat recording media in sliding, open-top trays which can be slid into pockets in a housing and pulled out to a position for removal of the recording media, comprising:

a plurality of sliding trays including a lower portion of a standard package for recording media and having a front edge and a rear edge, said package having its top removed;

a housing having a plurality of open compartments extending to receive trays laterally therein, and having lateral guide rails for each tray on the inside of said housing, said housing including biasing means at the back of said housing for applying a bias on said trays when said trays are fully inserted;

locking lever means including a locking lever extending along one side of each of said compartments, said lever contacting said biasing means at the back of said housing and having a locking projection for restraining the front

edge of said tray against said biasing means when said tray is fully inserted;

actuating means attached to said locking projection of said lever for releasing said tray by movement of said actuating means toward said side of said housing, said housing and said lever having cooperative hook means for holding said lever in an unlocked position upon movement of said lever toward said side of said housing; and

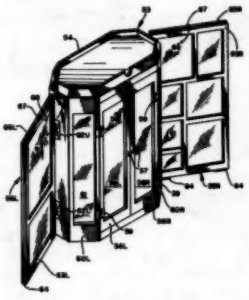
stop means on the back edge of said lever, said stop means being positioned to engage the rear edge of said tray when said tray is fully inserted to move said lever to disengage said hook means and permit said locking projection to restrain said tray in a fully inserted position.

4,702,534

WINGED DISPLAY CASE

Henry C. Witt, and Myong C. Witt, both of 910 Spring Valley Rd, Apt. #104, Richardson, Tex. 75080

Filed Sep. 16, 1985, Ser. No. 776,417
Int. Cl.[4] A47F *3/00*
U.S. Cl. 312—114 **1 Claim**



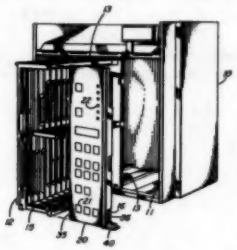
1. A display case structure comprising: an enclosure with a transparent front section and suited for containing memorabilia; wing means mounted on and extended to the side from said enclosure; and said wing means including a planar area for the mounting of pictures thereon that may be related to items displayed within said enclosure; wherein said wing means is pivotally mounted on said enclosure; said wing means is two opposite side wing panels; and said enclosure is a center enclosure; said center enclosure is an octagonal cabinet; wherein said octagonal cabinet is equipped with two opposite direction opening front doors with windows in each door; said octagonal cabinet has two opposite side octagonal angle faces also provided with windows for the viewing of articles placed within the octagonal cabinet; said octagonal cabinet has opposite side end faces mounting said two opposite side wing panels; said two opposite side wing panels are each subdivided into a plurality of windowed picture frames; said wing panels each have panel frame fronts subdivided into multiple picture frame sections and panel backs with the bottom of said panel frame fronts pivotally connected to the bottom of said panel backs; and wherein the tops of said panel frame fronts and said panel backs are provided with latch means that when unlatched permit the panel frame fronts to pivot out and away from said panel backs for picture mounting access.

4,702,535

ELECTRONIC EQUIPMENT DRAWER

Roger A. Beun, Dunrobin, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 9, 1986, Ser. No. 851,843
Claims priority, application Canada, Feb. 24, 1986, 502555
Int. Cl.[4] A47B *81/00*
U.S. Cl. 312—308 **6 Claims**



1. An electronic equipment drawer comprising:

a cabinet having an opening in its front;

a drawer slideably mounted in said cabinet through said opening for movement into or out of the cabinet; and having a front facing the opening in the cabinet;

said drawer including opposed sets of tracks for slideably retaining a plurality of circuit boards, said sets of opposed tracks being disposed orthogonal to the direction of movement of the drawer;

a faceplate for covering said front of the drawer,

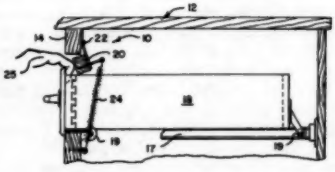
the faceplate being mounted on one of the plurality of circuit boards and moveable with said one circuit board as said one circuit board is slid along one of said sets of opposed tracks so that portions of the faceplate are slid into contiguous arrangement with the front of the drawer, whereby a force applied to the faceplate for inserting the drawer is substantially transferred directly to the surface of the front of the drawer and not to said one circuit board.

4,702,536

SAFETY DEVICE FOR BUREAU DRAWERS, CABINET DOORS AND THE LIKE

Francis Kraynak, R.D. #1 Box 392A, Uniontown, Pa. 15401

Filed Nov. 26, 1986, Ser. No. 935,191
Int. Cl.[4] A47B *88/00*
U.S. Cl. 312—330 R **5 Claims**



1. A safety device for containers having a frame member with at least one opening therein and a closure member therefor comprising:

(a) a stationary frame member located around at least one opening in the container adapted to accommodate a closure member;

(b) at least one movable stile positioned immediately between the closure member and the stationary frame member and pivotally attached to the stationary frame member so that said stile can swing from a closed position immedi-

ately adjacent the stationary frame member to an open position inside the container; and

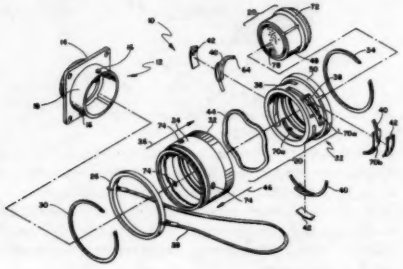
(c) tension means biasing said stile in its closed position, so that said stile will move freely into the container when forced and will return to its closed position when the force is released.

4,702,537

QUICK-DISCONNECT ELECTRICAL CONNECTOR COUPLING ASSEMBLY FOR USE WITH BAYONET PIN COUPLING SYSTEM

William R. Mattingly, Santa Ana, and Barry R. Trombly, Torrance, both of Calif., assignors to Matrix Science Corporation, Torrance, Calif.

Filed May 3, 1985, Ser. No. 729,847
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—152 **14 Claims**



1. A quick-disconnect electrical connector coupling assembly, comprising:

a cylindrical receptacle shell, the receptacle shell having a plurality of fixed bayonet pins surrounding the outer surface of the receptacle shell;

a connector plug assembly including a connector shell, the connector shell surrounded by an axially disposed first coupling ring;

a second coupling ring surrounding the first coupling ring;

the first coupling ring having a plurality of radially extending apertures, disposed through the first coupling ring, each aperture forming a recessed surface positioned helically along the circumference of the outer surface of the first coupling ring, and each aperture providing a seat for the positioning of a ramp spring segment and a floating land segment;

the ramp spring segment being a resilient arcuate segment having a radially extending guide rail protruding radially through each of the apertures of the first coupling ring, the ramp spring segment having opposingly disposed leaf spring segments integral with the ramp spring running along the sides of the ramp spring segment disposed against the recessed surface of the first coupling ring, so that the ramp spring segment may reciprocate radially between a protruding guide rail position and a retracted position as the bayonet pin of the receptacle shell travels along the guide rail of the ramp spring segment;

the floating land segment being juxtaposed atop the ramp spring, having a central ridge which contacts the inner surface of the second coupling ring, for positioning the floating land segment between two positions, one position along the axially extended inner surface of the second ring and the second position keyed within a radially disposed annular keyway formed along the entire circumference of the second coupling ring;

a wave spring normally biased when the connector shell is engaged with the receptacle to prevent the floating land from entering into the annular keyway by thrusting the first coupling ring in a first axial direction away from the mating surface of the receptacle shell; and,

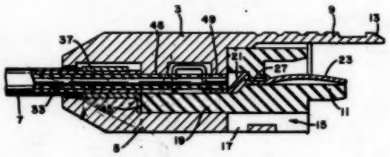
the wave spring being axially compressed when the connector shell is disengaged from the receptacle, the compressed spring thrusting the first coupling ring in a second axial direction moving the floating land segment into a circular keyway of the second coupling ring, so that the ramp spring segment recedes radially towards the second coupling ring allowing the connector shell to be quick-released from coupling with the receptacle shell.

4,702,538

SHIELDED MODULAR CONNECTOR FOR USE WITH SHIELDED TWISTED PAIR CABLE

Harold G. Hutter, Brookfield, and Dennis E. Tarrant, Bethel, both of Conn., assignors to Amphenol Corporation, Wallingford, Conn.

Continuation of Ser. No. 778,478, Sep. 20, 1985, abandoned. This application Feb. 25, 1987, Ser. No. 16,976
Int. Cl.[4] H01R *13/28*
U.S. Cl. 439—292 **8 Claims**



1. A shielded modular connector comprising:

a housing comprised of first and second parts constructed for being snapped together into engagement, one of the housing parts constructed such that insulation displacement contacts can be inserted and snapped thereinto to be retained thereby with the contact portion thereof being in a spring loaded bowed contact condition against a surface of the one part, and the other part having a press projection for forcing conductors into electrical contact with insulation displacement contacts received in the one part;

cable crimp means for crimping onto a cable having individual conductors, and constructed for being detachably held by receiving means in the one part of the housing constructed for retaining insulation displacement contacts;

insulation displacement contacts shaped for being received and retained in said one housing part, said contacts having contact portions such that when received in said first housing part the contact portions are in spring loaded condition, and having insulation displacement portions thereof in a position for having conductors forced into engagement therewith by the other housing part press projection when the first and second housing parts are snapped together;

retaining means comprising part of said one housing and shaped for being snapped into engagement therewith for retaining said insulation displacement contacts therein; and

said first and second parts having engaging means of a shape such that, when assembled, said modular connector can be connected to a like modular connector for establishing electrical interconnection between a pair of cables, and said first and second parts being coated on the exterior thereof with a shielding material.

4,702,539

CABLE CONNECTOR ASSEMBLY

Joseph B. Cusick, III, Peck, and Ty A. Raney, Valley Center, both of Kans., assignors to Tweco Products, Inc., Wichita, Kans.

Filed Apr. 11, 1986, Ser. No. 850,965
Int. Cl.[4] H01R *11/00*
U.S. Cl. 439—588 7 Claims

1. An electrical cable assembly, comprising:

a first and a second cable connector;

means defining a generally cylindrical connector post on said first connector, said post having a fixed end and a free end;

resilient insulating material substantially encasing said first and second cable connectors;

means defining a generally cylindrical recess in said second connector, said recess adapted to receive said connector post upon coupling; and

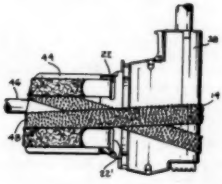
first cam means on said post and within said recess, operable by relatively rotating said connectors to pull said connector post into said recess thereby deforming said insulating material encasing said first and second cable connectors into sealing engagement, and second cam means on said post selectively engageable with said recess on relative rotation of said connectors to said position in sealing engagement so as to prevent axial removal of said connector post from said recess unless said connectors are relatively rotated substantially back to their original position prior to sealing engagement.

4,702,540

ELECTRICAL CONNECTOR HOLD-DOWN ADAPTOR

John A. Siemon, Watertown, Conn., assignor to The Siemon Company, Watertown, Conn.

Filed Aug. 5, 1986, Ser. No. 893,493
Int. Cl.[4] H01R *13/631*
U.S. Cl. 439—371 21 Claims



1. A retainer for releasably securing together a pair of mating electrical connectors, both of the connectors having a connection portion, at least one of the connectors having a body portion with the connection portion extending outwardly therefrom, the body portion also having a cable extending therefrom, the connection portions of both connectors being adapted to mate with each other, said retainer comprising:

a rigid bracket, said bracket having a substantially planer base portion with first and second oppositely disposed arms extending outwardly from said base portion at an angle, said first arm having at least a first slot extending therethrough, said second arm having a pair of oppositely disposed second slots extending therethrough, said base portion having an aperture extending therethrough, said aperture having a size and shape which permits the connection portions of electrical connectors to pass therethrough, said aperture having a cross-sectional area which is smaller than the cross-sectional area of the connector body portion; and

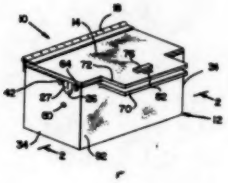
a flexible strap, said strap including a first portion having loops and a second portion having flexible hook members extending outwardly from a first side thereof, and a third portion having flexible hook members and a fourth portion having loops extending outwardly from a second side thereof, said loops and hooks cooperating when brought into contact to releasably secure said first strap portion to said second strap portion, and said third strap portion to said fourth strap portion after said flexible strap is wrapped around at least one electrical connector, and strap passing through said first slot and said pair of slots in said bracket arms whereby said strap is attached to said bracket.

4,702,541

EXTENSION CORD CONNECTOR GUARD

Michael Arnold, 7740 Summerdale Ave., Apartment B-1, Philadelphia, Pa. 19111

Filed Jul. 31, 1986, Ser. No. 890,951
Int. Cl.[4] H01R *13/52*
U.S. Cl. 439—304 4 Claims



1. An extension cord connector guard for protecting the interconnected ends of electrical cords comprising:

a substantially closed housing, said housing being provided with reclosable means for accessing the interior of said housing, the reclosable means being movable between a first position wherein the housing interior is exposed and a second position wherein the housing is closed;

at least two extension cord ports provided in said housing, said ports comprising means for adjusting the effective size of said ports and first sealing means to prevent the entrance of water into the housing interior through the said ports,

the first sealing means comprising a resilient seal secured within a said cord port,

the means for adjusting comprising a closure member movable secured to the housing, the closure member being movable between a first position wherein at least part of a cord port is covered and a second position wherein the cord port is uncovered,

the said closure member comprising at least one hook portion and a first post mounted on said housing for engaging said hook portion and retaining said closure member in the first position; and

latch means for retaining the said reclosable means in the said second position in a substantially child resistant manner.

4,702,542

LATCH AND LOCK ELECTRICAL CONNECTOR HOUSING

Robert W. Noyes, Framingham, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

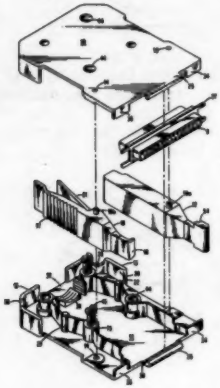
Filed May 14, 1986, Ser. No. 863,203
Int. Cl.[4] H01R *13/627*
U.S. Cl. 439—347 10 Claims

1. A housing for holding an electrical connector so that said

connector and said housing may mate and latch with another connector held in another housing, said housing comprising:

first and second housing halves, each half including means for receiving said connector, said first and said second housing halves each having a plurality of projections in predetermined positions, and a plurality of first and second holes in predetermined positions;

said predetermined positions of said first holes and said projections being located such that when said housing halves are mated together to hold said connector between said receiving means of said halves of an assembled housing, said projections of said first housing half are inserted into said first holes of said second housing half, and said projections of said second housing half are inserted into



said first holes of said first housing half locking said first and second housing halves securely together, and each of said second holes in said first housing being coaxially aligned with a corresponding one of said second holes in said second housing half when both said housing valves are mated together to assembly said housing; and

a number of latching arms, each latching arm being associated with a different pair of said coaxially aligned second holes, each of said latching arms having two opposed coaxial protrusions, said protrusions being inserted into said coaxially aligned second holes for retaining each said latching arm within said housing when said first and second housing halves ae being locked together, and each said latching arm enabling said housing to be latched to said another housing.

4,702,543

ENVIRONMENTAL SEAL AND ALIGNMENT MEANS FOR AN ELECTROMAGNETICALLY FORMED BACKSHELL

Jeffrey J. Hager, Port Hueneme, Calif., assignor to G & H Technology, Inc., Santa Monica, Calif.

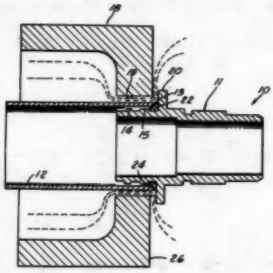
Filed Apr. 30, 1986, Ser. No. 857,255
Int. Cl.[4] H01R *13/504*
U.S. Cl. 439—271 **4 Claims**

1. An article of manufacture comprising:

a hollow cylindrical metal tube;

a cylindrical member of outer diameter less than the tube inner diameter, said member having end portions received within an end of the tube and uniformly spaced from facing tube inner wall surfaces, said member further having a radially outwardly extending flange lying directly opposite and spaced from the member end portions;

an annular resilient seal of generally L-shaped cross-section located between both the tube inner wall surfaces and member end portions and between and in contact with the tube end and the member flange;



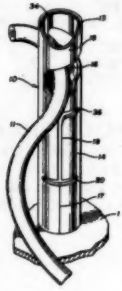
said metal tube being magnetically clamped onto the member end portions over the seal compressing the same.

4,702,544

ELECTRICAL CONNECTOR

Vasantrai A. Vachhani, Eden Prairie, and Gilbert D. Bodimer, Burnsville, both of Minn., assignors to Magnetic Controls Company, Minneapolis, Minn.

Filed May 6, 1983, Ser. No. 492,215
Int. Cl.[4] H01R *4/24*
U.S. Cl. 439—395 **7 Claims**



1. An electrical connector for terminating or connecting an electrical wire comprising:

an elongated tubular sleeve section having a side wall and a longitudinal axis;

an elongated wire receiving slot defined by a pair of opposing wire gripping edges in said side wall and extending generally parallel to said longitudinal axis;

a flared entryway defined by a pair of flared edges comprising an extension of said pair of opposing wire gripping edges; and

wire retaining means for temporarily retaining the electrical wire within said flared entryway in position for termination or connection within said wire receiving slot, said wire retaining means including a wire retention groove formed in said side wall and disposed immediately above said flared entryway and being spaced below the upper end of said sleeve section, said wire retention groove having upper and lower edges which extend from said flared edges, respectively, and a side opening in said side wall between said upper and lower edges for receiving the electrical wire, said upper and lower edges, and thus said wire retention groove, sloping upwardly from said wire receiving slot relative to the longitudinal axis of said sleeve section.

4,702,545

CONTACT SPRING

Werner Moyaert, Jabbeke, Belgium, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 12, 1986, Ser. No. 940,949

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1985, 3544223

Int. Cl.[4] H01R 13/11

U.S. Cl. 439—856 8 Claims

1. A contact spring, comprising:

a sheet metal strip defining a longitudinal extent;

a strip section at one end of said strip having a U-shaped bend opposite the longitudinal extent of said strip;

a recess in the region of said bend to accept a contact element;

a first contact surface formed by a portion of said strip section bent-back by said U-shaped bend and immediately adjacent said bend;

a tongue cut free from said sheet metal strip along the longitudinal extent; and

a second contact surface formed by a free end of said tongue, said free end of said tongue disposed immediately adjacent said U-shaped bend and opposite said first contact surface.

4,702,546

LIGHT SOURCE DEVICE

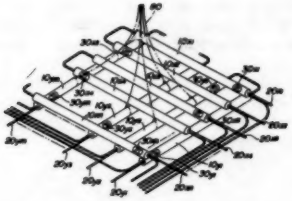
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Sep. 5, 1985, Ser. No. 772,824

Claims priority, application Japan, Sep. 14, 1984, 59-193076

Int. Cl.[4] G02B 6/00, 17/00

U.S. Cl. 350—96.1 10 Claims



1. A light radiator comprising a first plurality of first transparent cylinder means, each of said first transparent cylinder means having a first longitudinal axis, first optical conductor means for guiding light rays into said first transparent cylinder means through one longitudinal end of said first transparent cylinder means, first optical means accommodated in said first transparent cylinder means for reflecting said light rays guided into each first transparent cylinder means from said first optical conductor means and radiating said light rays outside of said first transparent cylinder means, a second plurality of second transparent cylinder means, each of said second transparent cylinder means having a second longitudinal axis, second optical conductor means for guiding light rays into said second transparent cylinder means through one longitudinal end of said second transparent cylinder means, second optical means accommodated in said second transparent cylinder means for reflecting said light rays guided into said second transparent cylinder means from said second optical conductor means and radiating said light rays outside of said second transparent cylinder means, driving means for moving said first optical means along the longitudinal axial direction of said first transparent cylinder means and for moving said second optical means along the longitudinal axial direction of said second transparent cylinder means, said first plurality of first transparent cylinder means having their longitudinal axes disposed parallel to each other and extending in a first direction, said second plurality of second transparent cylinder means having their longitudinal axes disposed parallel to each other and extending in a second direction, said said first direction being transverse to said second direction to thereby provide a criss-cross array of said first and second transparent cylinder means, whereby said criss-cross array is disposed in a position to overlie growing plants such that said criss-cross array provides light energy to the underlying growing plants.

4,702,547

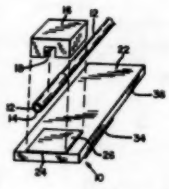
METHOD FOR ATTACHING AN OPTICAL FIBER TO A SUBSTRATE TO FORM AN OPTICAL FIBER PACKAGE

R. Scott Enochs, Hillsboro, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 28, 1986, Ser. No. 889,703

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.2 16 Claims



15. A method for attaching an optical fiber to a substrate comprising:

providing a silicon member having a groove therein sized to receive an optical fiber;

inserting an optical fiber within said groove, said optical fiber comprising an external layer of gold thereon;

positioning said silicon member on a substrate comprised of alumina, said substrate having at least one metal pad thereon, said metal pad comprising an external layer of gold, said silicon member being placed directly on said external layer of gold of said pad; and

heating said substrate, silicon member, and optical fiber at a temperature of at least 370° C., said temperature being sufficient to cause the silicon of the silicon member to form a eutectic alloy with both the external layer of gold on said optical fiber, and the external layer of gold of said metal pad, said heating being accomplished by at least one resistor connected to a source of electrical current, said resistor being affixed to said substrate.

4,702,548

APPARATUS FOR SEPARATING OR SYNTHESIZING LIGHT SIGNALS

Masao Tanaka; Okosu Watanabe, and Koichi Inada, all of Chiba, Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Jan. 30, 1985, Ser. No. 696,448

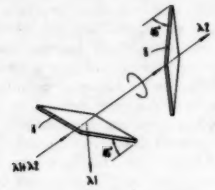
Claims priority, application Japan, Feb. 29, 1984, 59-37691

Int. Cl.[4] G02B 6/28

U.S. Cl. 350—96.15 4 Claims

1. An apparatus for separating light signals composed of light of a first wavelength and light of a second wavelength comprising:

first and second dielectric multilayer thin film filters substantially transparent to light of said second wavelength disposed with a spacing along a straight optical path and inclined by 45° with respect to the axis of said straight optical path,



said first filter substantially reflecting light of said first wavelength from said straight optical path onto an optical path orthogonal to said straight optical path, and

said second filter being rotated about said straight optical path by an angle in relation to said first filter so as to be substantially opaque to light of said first wavelength transmitted by said first filter along said straight optical path.

4,702,549

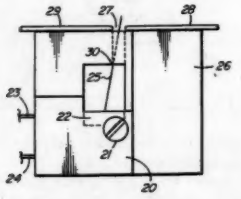
RECIPROCATING VARIABLE OPTICAL ATTENUATOR FILTER

Gary S. Duck, 8 Thistledown Court, Nepean, Ontario, Canada K2J 1M9, and William J. Sinclair, 73 Young Road, Kanata, Ontario, Canada K2L 1V9

Filed Aug. 16, 1984, Ser. No. 641,397

Int. Cl.⁴ G02B *6/26*

U.S. Cl. 350—96.15 **9 Claims**



1. A variable optical filter comprising: two optical fibres having their arc-rounded ends aligned opposite each other and separated by a predetermined gap; a thin optical filter element in said gap mounted on a reciprocating means for selectively positioning said filter element between the fibre ends along a transversal axis perpendicular to their axis of alignment; and said filter element mounted on said reciprocating means such that is is not perpendicular to said axis of alignment of the fibre ends.

4,702,550

OPTICAL FIBER FREQUENCY FILTER AND MULTIPLEXER USING SAME

Yasukazu Sano, Kanagawa, Japan, assignor to Fuji Electric Company, Ltd., Kanagawa, Japan

Filed Jan. 21, 1983, Ser. No. 459,909

Claims priority, application Japan, Mar. 8, 1982, 57-36246; Mar. 8, 1982, 57-36247; Mar. 8, 1982, 57-36248

Int. Cl.⁴ G02B *6/28;* **H04B** *9/00*

U.S. Cl. 350—96.16 **18 Claims**

1. An optical filter comprising:

optical adding means having first and second input ports and an output port, an optical input signal to be filtered being applied to said first input port;

optical splitting means having an input port and first and second output ports, said first output port of said optical splitting means being coupled to said second input port of said optical adding means, a filtered output signal being produced at said second output port of said optical splitting means; and

optical delaying means and optical attenuating means coupled in series with one another between said output port of said optical adding means and said input port of said optical splitting means.

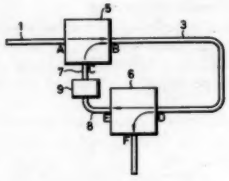
15. An optical frequency multiplexing circuit comprising:

optical coupler means for combining at least two optical inputs which are amplitude-modulated at a frequency particular for each of said optical imputs into a single optical output;

optical splitter means for splitting an optical input at least into two optical outputs;

an optical fiber coupled between said optical output of said optical couple means and said optical input of said optical splitter means; and

a plurality of optical frequency filters coupled respectively



to each of the output ports of said optical splitter means for transmitting only an optical signal at said particular frequency corresponding to a respective one of said optical inputs and for blocking optical signals at said particular frequencies not corresponding to said respective one of said optical inputs, wherein said optical filters each comprise:

optical adding means having first and second input ports and an output port, an optical input signal to be filtered being applied to said first input port;

optical splitting means having an input port and first and second output ports, said first output port of said optical splitting means being coupled to said second input port of said optical adding means, a filtered output signal being produced at said second output port of said optical splitting means;

optical delaying means and optical attenuating means coupled in series with one another between said output port of said optical adding means and said input port of said optical splitting means.

4,702,551

METHOD AND APPARATUS FOR HANDLING AND STORING CABLED SPLICED ENDS OF FIBER OPTICS

David J. Coulombe, Skokie, Ill., assignor to Reliance Comm/Tec Corporation, Chicago, Ill.

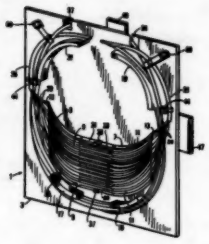
Filed Oct. 11, 1984, Ser. No. 659,580

Int. Cl.⁴ G02B *6/36, 7/26*

U.S. Cl. 350—96.20 **18 Claims**

9. Apparatus for storing the spliced end sections of optical fibers from first and second cables comprising a tray having means forming first and second series of side-by-side arcuate channels each for receiving an optical fiber and for confining the fiber in a path which defines a radius greater than the shortest radius of bend which the fiber can undergo without damage due to excess flexure, the first series being spaced from the second series by a gap, a splice block releasably mounted in said gap, said splice block also having means forming a series of channels for receiving said spliced end sections, said splice block channels substantially spanning said gap whereby the

respective channels in the first series are connected to the corresponding channels in the second series by the channels in



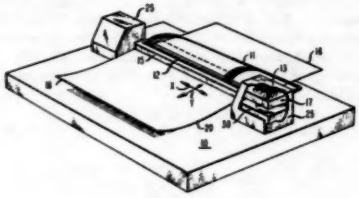
the splice block, and means for accumulating and storing on said tray fibers leading from the spliced end sections to the first and second cables.

4,702,552

DOCUMENT SCANNER EMPLOYING A FIBER OPTIC BUNDLE AND EXHIBITING GREY SCALE

George D. Margolin, Newport Beach, Calif., assignor to Photon Devices, Ltd., Sherman Oaks, Calif.

Filed Jul. 3, 1985, Ser. No. 752,501
Int. Cl.[4] G02B *6/06; G03B 27/00*
U.S. Cl. 350—96.25 12 Claims



1. In combination, a fiber optic bundle having first and second ends arrayed randomly in first and second geometries respectively, means for directing input radiation signals representative of data at the fibers of said first end, utilization means cooperative with said fibers at said second end, and electronic control means for associating the signals exiting from said second end with the corresponding input signals at said first end in a manner to preserve coherence therebetween, said electronic control means being adapted to provide redundant sensor means in N subsets each having at least one sensor for each of said fibers, said electronic control means comprising means for activating said N subsets for N different time periods in a manner to generate N like representations of said input signals, and means for associating said N like representations with N different radiation intensities corresponding to said N different time periods.

4,702,553

FIBER-OPTICAL SENSOR FOR DETECTING ELECTRIC ARC-DISCHARGES

Reino Buchmüller, Heddesheim, and Bernd Weissenborn, Laudenbach, both of Fed. Rep. of Germany, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jul. 20, 1982, Ser. No. 400,154
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1981, 3129041
Int. Cl.[4] G02B *6/02, 6/16*
U.S. Cl. 350—96.29 9 Claims

1. A fiber optic sensor for detecting electric arc-discharges of the type accompanied by sound waves, said sensor comprising:

an optical fiber, a portion of which being arranged to be subject to electric arc-discharges of the type accompanied by sound waves, whereby light waves produced by an electric arc-discharge are transmitted through said optical fiber,

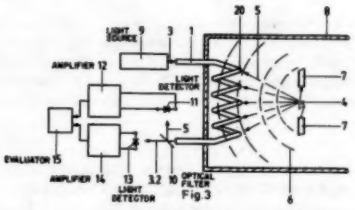


Fig. 3

a test light source disposed at an end of said optical fiber for transmitting a test light through the optical fiber, which test light is modulated by sound waves accompanying an electric arc-discharge,

a first light detector disposed at another end of said optical fiber for receiving said test light modulated by the sound waves, and

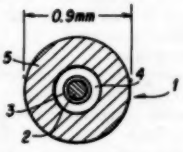
a second light detector disposed at said other end of said optical fiber for receiving said arc-produced light waves.

4,702,554

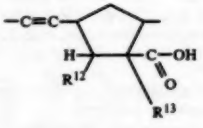
COATED OPTICAL FIBER

Hiroshi Takahashi; Tetsuji Kakizaki; Mitsuyoshi Kato, and Koji Nishida, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

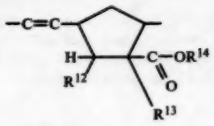
Filed Aug. 24, 1984, Ser. No. 643,731
Claims priority, application Japan, Sep. 2, 1983, 58-161641
Int. Cl.[4] B32B *9/00;* G02B *6/10, 6/00*
U.S. Cl. 350—96.30 2 Claims



1. A coated optical fiber comprising an optical fiber for transmitting information having coated thereon a layer of a homopolymer or a copolymer containing a ring-opened norbornene derivative having a polar group as a structural unit, wherein said ring-opened norbornene derivative is composed of a structural unit (A) of formula (II)



and a structural unit (B) of formula (III)



wherein R^{12} represents a hydrogen atom, an alkyl group or a phenyl group, R^{13} represents a hydrogen atom or an alkyl group, and R^{14} represents an alkyl group, the mole ratio of (A)/(A)+(B) being from 0 to 0.85, wherein the intrinsic viscosity of said homopolymer or copolymer is from 0.2 to 2.0.

4,702,555

OPTICAL SYSTEM DRIVE FOR OPTICAL RECORDING/REPRODUCING APPARATUS

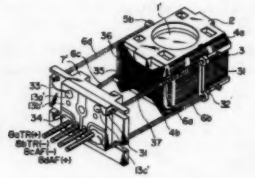
Akira Iguma; Tadashi Okuda; Kouichi Ieki, all of Toyokawa, and Toshio Sasamoto, Fussa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 8, 1985, Ser. No. 731,947

Claims priority, application Japan, May 14, 1984, 59-94453

Int. Cl.[4] G02B *7/04*

U.S. Cl. 350—247 **10 Claims**



1. A bobbin wound with driving coils and having mounted thereon a lens for transmitting a light beam, wherein said light beam is controlled by drive currents flowing through said coils, comprising:

(a) a mounting hole for mounting said lens and passing therethrough said light beam transmitting through said lens;

(b) first recesses formed in a pair of opposite side faces of said bobbin, respectively, substantially in parallel with the axis of said mounting hole for accomodating therein one of said coils which is wound substantially perpendicularly to the axis of said mounting hole;

(c) notches formed in said first recesses in parallel with the axis of said mounting hole for passing therethrough terminal end/start end portions of said one of said coils; and

(d) second recesses formed along two opposite sides of said opposite side faces, respectively, for accommodating therein the other coils which are wound so as to intersect each other at other pair of opposite side faces of said bobbin, respectively.

4,702,556

METHOD OF ASSEMBLING A LIGHT EMITTING DEVICE WITH AN OPTICAL FIBER

Satoru Ishii, Tamamura; Tugio Nemoto, and Kunio Aiki, both of Takasaki, all of Japan, assignors to Hitachi, Ltd. and Hitachi Iruma Electronic Co., Ltd., both of Tokyo, Japan

Filed Aug. 22, 1984, Ser. No. 643,259

Claims priority, application Japan, Aug. 22, 1983, 58-151575

Int. Cl.[4] G02B *6/42*

U.S. Cl. 350—320 **14 Claims**

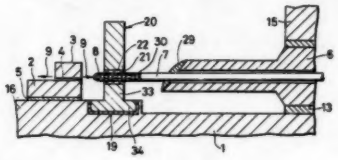
1. A method of assembling a light emitting device with an optical fiber comprising the steps:

(a) preparing a stem having a pedestal portion;

(b) fixing supporting means for an optical fiber on said stem, said supporting means having a hole and being deformable in three orthogonal directions;

(c) mounting a laser diode chip on said pedestal portion of said stem;

(d) inserting a portion of the optical fiber into said hole and fixing said optical fiber immovably in said hole, and after the step (d);



(e) manipulating said supporting means in any one or more of the three orthogonal directions while observing light output from the optical fiber to determine an optimum position of a photocoupled end part of said optical fiber relative to a light emitting portion of said laser diode chip and fixing the supporting means in the optimum position.

4,702,557

OPTICAL BRANCHING DEVICE USING A LIQUID CRYSTAL

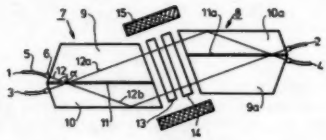
Friedrich K. Beckmann; Horst Dötsch, both of Pinneberg, and Wolfgang Hoppe, Norderstedt, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 633,726, Jul. 23, 1984, abandoned. This application Sep. 15, 1986, Ser. No. 908,887

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327417

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—330 **17 Claims**



1. An optical branching device having a longitudinal axis, said device comprising:

a first polarization-sensitive beam splitter for forming two radiation beams linearly polarized in perpendicular directions;

a second polarization-sensitive beam splitter for combining two radiation beams linearly polarized in perpendicular directions; and

an optical polarization rotating device arranged between the first and second polarization-sensitive beam splitters to receive the two linearly polarized radiation beams, said optical polarization rotating device rotating the planes of polarization of the radiation beams;

characterized in that:

each polarization-sensitive beam splitter comprises:

(i) a prism having a planar base, said prism being made of an amorphous material;

(ii) a rhombohedral plate having a planar surface arranged adjacent to the base of the prism, said prism and base having surfaces such that the two radiation beams formed or combined are parallel to each other, said rhombohedral plate being made of an amorphous material; and

(iii) a liquid crystal layer arranged between the prism base and the plate;

the plate of the first polarization-sensitive beam splitter is arranged on a first side of the longitudinal axis; and

the plate of the second polarization-sensitive beam splitter is arranged on a second side of the longitudinal axis, opposite the first side.

4,702,558

LIQUID CRYSTAL INFORMATION STORAGE DEVICE

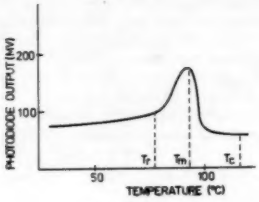
Harry J. Coles, Woodford, and Richard Simon, Macclesfield, both of England, assignors to The Victoria University of Manchester, Manchester, England

Filed Sep. 10, 1984, Ser. No. 648,519

Claims priority, application United Kingdom, Sep. 14, 1983, 8324642

Int. Cl.⁴ C09K *19/00, 19/52, 19/12*; G02F *1/13*

U.S. Cl. 350—330 **21 Claims**



1. A liquid crystal information storage device comprising a layer of material containing a side chain polymeric liquid crystal of a type having a glass transition temperature Tg less than ambient temperature Ta normally experienced atmospherically, and a further temperature Tr at which the viscosity suddenly decreases and above which the material becomes fluid while remaining in the same mesophase up to Tm, corresponding to the point at which the isotropic or clear phase first begins to appear, and is biphasic until Tc at which temperature the material becomes fully isotropic where $Tc>Tm>Tr>Ta>Tq$, means for effecting a thermal transition of at least a part of the material from a viscous state in which its temperature is in the range Tg to Tr, to the fluid region above Tr, and means for addressing at least a part of the material in the fluid region so as to achieve a selective variation in texture and orientation of molecules within the material and so record information, which information is retained on allowing the material to cool out of the fluid region and return to the viscous state.

4,702,559

LIQUID-CRYSTAL DISPLAY MADE FROM CONTINUOUS PLASTIC FILM SPLIT AND FOLDED THROUGH 90 DEGREES

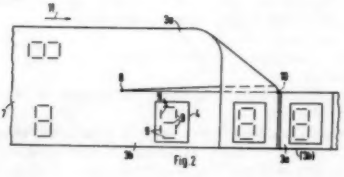
Rolf Zondler, and Jurgen Pottharst, both of Stuttgart, Fed. Rep. of Germany, assignors to Standard Electrik Lorenz, Stuttgart, Fed. Rep. of Germany

Filed Sep. 11, 1986, Ser. No. 906,116

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532485

Int. Cl.⁴ G02F *1/13*

U.S. Cl. 350—331 R **2 Claims**



1. In a continuous process of manufacturing a plurality of individual liquid-crystal display units wherein a flexible, transparent material is continuously provided with electrodes for a plurality of individual liquid-crystal display units and a parallel orientation is continously imparted to its surface, spacing means for one particular individual display unit are positioned on one portion of said material, a second portion of said material for forming the opposing side of said one particular individual display unit is then placed on said first portion, and the two portions are then sealed together and the sealed structure is cut to form said one particular individual liquid-crystal display unit, the improvement comprising:

(a) continually dividing a single film strip of said flexible, transparent material into a first film and a second film after said electrodes have been provided for said particular individual liquid-crystal display unit and said parallel orientation has been imparted thereto, and

(b) continually folding said first film through 90° prior to placing said first film on said second film while said first film and said second film are still attached to said single film strip.

4,702,560

LIQUID CRYSTAL DISPLAY DEVICE

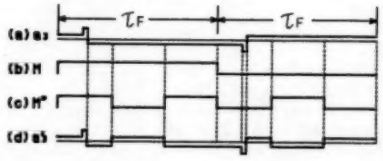
Shyusuke Endo; Naofumi Aoyama; Toshihiko Yabuuchi, all of Mobara; Toshiyuki Sakuma, Ouhara, and Kiyoshige Kinugawa, Mutsusawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 9, 1985, Ser. No. 785,652

Claims priority, application Japan, Oct. 11, 1984, 59-211312; Nov. 2, 1984, 59-230101

Int. Cl.⁴ G02F *1/133*

U.S. Cl. 350—333 **16 Claims**



1. A liquid crystal display device comprising:

a liquid crystal module including a liquid crystal display panel having a plurality of liquid crystal picture elements arranged in a matrix form, and driving circuits for applying driving signals to signal electrodes and to scanning electrodes of the liquid crystal display panel, respectively;

a control circuit for controlling the operation of the liquid crystal module;

first means for dividing frequency of a timing signal given by the control circuit and producing a first signal of lower frequency; and

second means for inverting the first signal of lower frequency once per frame period and generating a second signal to reverse the polarity of voltages applied to liquid crystal display elements with its period $\tau_{M'}$ satisfying the inequality

$$2.0 \leqq \tau_F(\text{the frame period})/\tau_{M'} \leqq 6.0.$$

4,702,561
PLEOCHROIC DYES AND ELECTRO-OPTICAL DISPLAYS THEREWITH

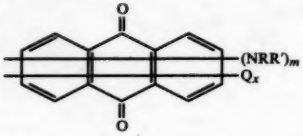
William A. Huffman, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 908,671, May 23, 1978, abandoned, which is a continuation-in-part of Ser. No. 786,489, Apr. 11, 1977, abandoned. This application Aug. 28, 1979, Ser. No. 70,421

Int. Cl.[4] C09K *19/00;* G02F *1/13*

U.S. Cl. 350—349 32 Claims

1. As a composition of matter the combination having dielectrically positive anisotropy comprising at least one nematic liquid crystalline material having dielectrically positive anisotropy and dissolved therein a pleochroic dyestuff of the general formula:



wherein substituents

(NRR') and Q may be in positions 1 through 8,

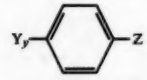
Q is F, Cl, NO_2, NH_2, NH(Alk), OH,

x is 0, 1, 2, 3,

m is 1 or 2,

R is H,

R' is cyclohexyl, bicyclohexyl or $-(CH_2)_p-$Ar where p is 0, 1 or 2 and Ar is aryl of 6 to 10 carbon atoms substituted in the 4 position by $-NHCOCH_3$, CN, C_bH_{2b+1}, $-OC_nH_{2n+1}$, cyclohexyl, 4—(Alk)—cyclohexyl or



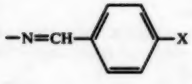
where y is 0 or 1

Y is CH_2, O, S, or OCH_2

Z is H, NO_2, CN, $-C_nH_{2n+1}$, $-OC_nH_{2n+1}$, F, Cl, and, when y is 0, Z can also be $-C_6H_5$, and

wherein Ar can be substituted in from 0 to 2 further positions by CN, $-C_nH_{2n+1}$, $-OC_nH_{2n+1}$, NH_2, or OH, provided that when p is 1 or 2 Ar can be unsubstituted aryl, and

when m is 2, the substituent R and R' taken together with N to which R is attached can alternatively be



where X is NO_2, CN, $-C_nH_{2n+1}$, $-OC_nH_{2n+1}$, or $N(Alk)_2$,

n is 1 to 20,

b is 2 to 20; provided that when p is 1 or 2 b can be 1 to 20, and

Alk is alkyl of 1–8 carbon atoms.

4,702,562
LIQUID CRYSTAL PHASE

Bernhard Scheuble, Alsbach; Rudolf Eidenschink, Münster, and Georg Weber, Erzhausen, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Jan. 17, 1985, Ser. No. 692,074

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1984, 3401338

Int. Cl.[4] G02F *1/13;* C09K *19/54, 19/06, 19/30*

U.S. Cl. 350—350 R 9 Claims

1. In a nematic liquid crystal phase, comprising at least two liquid-crystalline compounds, selected from the nematic and nematogenic azoxybenzene, benzylideneaniline, biphenyl, terphenyl, phenyl or cyclohexyl benzoate, phenyl or cyclohexyl cyclohexanecarboxylate, phenylcyclohexane, cyclohexylbiphenyl, cyclohexylcyclohexane, cyclohexylnaphthalene, 1,4-biscyclohexylbenzene, 4,4'-bis-cyclohexylbiphenyl, phenyl- or cyclohexyl-pyrimidine, phenyl- or cyclohexyl-dioxane, haloganted or non-halogenated stilbenes, benzyl phenyl ether, tolane, substituted cinnamic acid, phenyl- or cyclohexyl-1,3-dithiane, 1,2-bis-cyclohexylethane, 1-phenyl-2-cyclohexylethane or 1,2-bis-phenylethane classes,

the improvement wherein the phase further comprises at least one liquid crystalline discotic compound of the formula:

wherein

n=3–6 and

x is R, —OR, —COR, —OCOR, —COOR, —SR, —SOR or $—SO_2R$ and

R is C1–12 alkyl or C1–12-alkyl wherein one or two non-adjacent and non terminal CH_2 groups are replaced by O atoms.

4,702,563
BATTERY TESTER INCLUDING TEXTILE SUBSTRATE

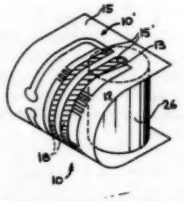
Robert Parker, 411 Rolling La., Alamo, Calif. 94507

Filed Apr. 15, 1985, Ser. No. 723,329

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.

Int. Cl.[4] G02F *1/133;* G01R *19/165*

U.S. Cl. 350—351 37 Claims



1. A battery tester incorporating liquid crystal material which reversibly changes color proportional to the heat produced by an electric current flowing through the tester, said battery tester, said battery tester comprising:

a flexible substrate;

a layer of absorber material located on a portion of said substrate, and

a layer of a cholesteric liquid crystal located on a portion of said substrate;

at least one pattern of electrically conductive material having terminal end sections located on said substrate and in alignment with said liquid crystal layer and said absorber material layer except for said terminal end sections,

said substrate being constructed of material of sufficient

flexibility to enable said terminal end sections of said electrically conductive material to be placed in contact with the terminals of an associated battery;

scale means having calibration markings thereon for indicating the strength of an associated battery; and

whereby contact of said terminal end sections with terminals of an associated battery causes a current to flow through said conductive material which causes portions of said conductive material to heat, the heat being transferred to said liquid crystal material causing said liquid crystal material to change color proportional to the current flowing through said conductive material.

4,702,564

BATTERY TESTER INCLUDING FLEXIBLE SUBSTRATE AND POLYACETILYNIC MATERIAL

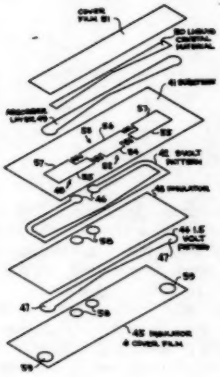
Robert Parker, 411 Rolling La., Alamo, Calif. 94507

Continuation-in-part of Ser. No. 723,329, Apr. 15, 1985. This application Apr. 3, 1986, Ser. No. 847,947

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.

Int. Cl.[4] G02F *1/133*; G01R *19/165*

U.S. Cl. 350—351 **18 Claims**



1. A battery tester which utilizes liquid crystal material that changes color proportional to the current produced by a battery being tested, said tester comprising:

a substrate constructed of flexible material;

at least one pattern of electrically conductive material having terminal end sections located on said substrate; and

at least one layer of a cholesteric liquid crystal material located on said substrate and in alignment with and extending along a portion of said conductive material pattern;

said substrate being constructed of material of sufficient flexibility to enable said terminal end sections of said electrically conductive material to be placed in contact with the terminals of an associated battery; scale means having calibration markings thereon for indicating the strength of an associated battery; and

whereby contact of said terminal end sections with terminals of an associated battery to be tested causes a current to flow through said condutive material which causes portions of said conductive material to heat, the heat being transferred to said liquid crystal material causing said liquid crystal material to change color proportional to the current flowing through said conductive material.

4,702,565

CROSS-SLIDE STAGE FOR A MICROSCOPE

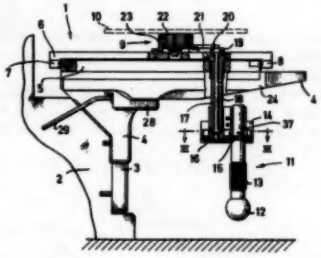
Albert Schilling; Edwin Schüttler; Karl-Wilhelm Schmekel, and Axel Rohde, all of Aalen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Oberkochen, Fed. Rep. of Germany

Filed Feb. 26, 1986, Ser. No. 833,064

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1985, 3508094

Int. Cl.[4] G02B *21/26, 21/36*; A47B *3/06*

U.S. Cl. 350—531 **8 Claims**



1. A microscope-stage assembly comprising base-mounting structure establishing a generally horizontal plane of support, a main slide supported by and guided for one axis of displacement with respect to said structure, a cross slide supported by and guided for a second axis of displacement with respect to said main slide, and a specimen mount rotatably carried by said cross slide, said main slide having a slotted opening beneath said cross slide and on an alignment parallel to said second axis, said base-mounting structure having an opening beneath said main slide and its slot, said last-mentioned opening having an area approximating the specimen area to be examined under microscope, an actuating handle secured to the underside of the cross slide and extending therebeneath through and below both openings, and rotary-adjustment means including an actuator movably carried by said handle and accessible below both openings, said rotary-adjustment means having rotary-drive connection to said specimen mount solely via said openings.

4,702,566

ELECTROCHROMIC DISPLAY DEVICE

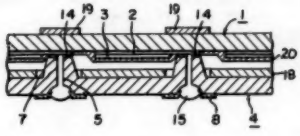
Noboru Tukude, Yokohama, Japan, assignor to Asahi Glass Company Ltd., Tokyo, Japan

Filed Apr. 3, 1985, Ser. No. 719,452

Claims priority, application Japan, Apr. 12, 1984, 59-71844

Int. Cl.[4] G02F *1/01*

U.S. Cl. 350—357 **7 Claims**



1. An electrochromic display device which comprises:

a display substrate comprising a transparent substrate and a display electrode formed on the substrate for display by an electrochromic material;

a counter substrate provided with a counter electrode facing said display electrode with a space therefrom; and

an electrolyte in the space between the display electrode and the counter electrode,

wherein the counter substrate is provided with through-holes, and a conductive material extends through each

through-hole and is in direct contact with a transparent electrode of the display substrate so that the transparent electrode of the display substrate is conductively connected to an electrode on the rear side of the counter substrate,

wherein the counter substrate has a recess to receive the electrolyte and protrusions, with said through-holes, are formed in the recess, and the top of each protrusion is conductively connected to the transparent electrode of the display substrate.

4,702,567

ZOOM LENS

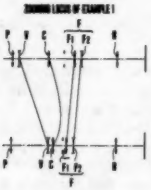
Masatake Kato, Tokyo; Keiji Ikemori; Tsunefumi Tanaka, both of Kanagawa, and Kazuo Tanaka, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 485,216, Apr. 15, 1983, abandoned. This application Feb. 18, 1987, Ser. No. 17,025

Claims priority, application Japan, Apr. 24, 1982, 57-68951; Aug. 30, 1982, 57-150513

Int. Cl.[4] G02B *15/18*

U.S. Cl. 350—427 **5 Claims**



1. A zoom lens comprising:

a plurality of lens units axially movable for the zooming of said zoom lens and stationary during focusing; and

a compound lens unit, having a focusing sub-unit axially movable for focusing from an infinitely distant object to a close object and a further sub-unit stationary during focusing, lying on the image side of at least one of said plurality of lens units, and arranged upon zooming to move axially as a unit along with said plurality of lens units; said focusing and further lens units having substantially the same but opposite refractive powers so that the overall power of the compound lens unit is so small as to have substantially no influence on the zooming.

4,702,568

PHOTOGRAPHIC LENS WITH LARGE APERTURE RATIO

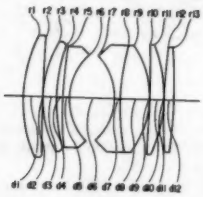
Sadao Okudaira, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 9, 1984, Ser. No. 569,465

Claims priority, application Japan, Feb. 16, 1983, 58-24358

Int. Cl.[4] G02B *9/62*

U.S. Cl. 350—464 **5 Claims**



1. A photographic lens with a large aperture ratio comprising a plurality of lens elements brighter than F 1.5 and having a total covering power of at least 40°, with at least one of the lens elements being capable of passing an entire luminous flux focusing on a center of an image plane through at least 80 percent of a lens aperture thereof, said plurality of lens elements including seven elements in six groups composed of a first positive lens, a second positive-meniscus lens, a third negative-meniscus lens, a compound lens comprising a fourth negative lens having opposite concave surfaces and a fifth positive lens having opposite convex surfaces, a sixth positive lens, and a seventh positive lens, successively arranged in order from an object, said at least one lens element being given a monotonous refractive index variation in the direction of an optical axis of the lens.

4,702,569

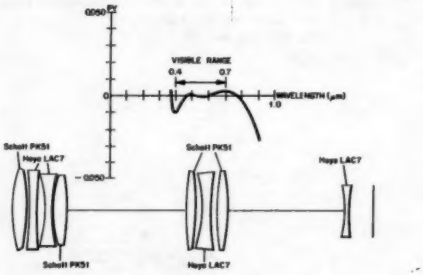
COLOR-CORRECTED PETZVAL LENS SYSTEMS

Romeo I. Mercado, San Jose, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Division of Ser. No. 419,705, Sep. 20, 1982. This application Jun. 16, 1986, Ser. No. 874,967

Int. Cl.[4] G02B *9/04*

U.S. Cl. 350—479 **14 Claims**



1. An optical lens system generally of the Petzval type, said lens system comprising a first group of lens elements and a second group of lens elements, said lens system being rotationally symmetric about an optic axis, the lens elements of said first and second groups coating with each other to achieve a common focus on said optic axis for paraxial marginal rays at more than two optical wavelengths, the lens elements of said first and second groups comprising said lens system being made of only two different optical materials.

4,702,570

STEREO-MICROSCOPE WITH TWO OBSERVATION OPTICAL SYSTEMS EACH INCLUDING A RIGHT ANGLE PRISM AND A ROOF RIGHT ANGLE PRISM PROVIDING BOTH ROTATION AND RELATIVE SEPARATION ADJUSTMENTS

Hisakazu Yoshino; Shinichi Nishimura, and Kazutoshi Takagi, all of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 637,503, Aug. 1, 1984, Pat. No. 4,601,550. This application Jan. 10, 1986, Ser. No. 817,931

Claims priority, application Japan, Aug. 8, 1983, 58-143685; Aug. 8, 1983, 58-143686

Int. Cl.[4] G02B *21/22*

U.S. Cl. 350—516 **1 Claim**

1. A Galileo type stereo-microscope comprising:

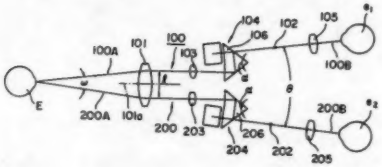
a common objective lens systems with a stereo angle (ω) defined as an angle between light rays entering through the common objective lens, from an incident optical axis of a first optical path and an incident optical axis of a second optical path, said first and second optical axes extending toward an object to be observed, respectively; first and second imaging lens systems, each having an optical

axis parallel to that of said objective lens system, and producing first and second intermediate images of the object to be observed, respectively;

a first observation optical system for observing the first intermediate image, including a first optical path deflecting means and a first ocular lens system having an optical axis which is coincident with an ejection optical axis of said first optical path deflecting means;

a second observation optical system for observing the second intermediate image and including second optical path deflecting means and a second ocular lens system having an optical axis which is coincident with an ejection optical axis of said second optical path deflecting means;

said first and second optical path deflecting means each comprising at least one fixed reflection surface and at least one rotatable reflection surface which can be rotated around a rotary axis which is perpendicular to a plane including optical axes of said first and second ocular lens systems; and



said first and second optical path deflecting means each serving also as an erecting optical system for erecting the respective intermediate image and each including a roof right angle prism having said fixed reflection surface and a right angle prism having said rotatable reflection surface, said roof right angle prism having a reflection optical axis, and said right angle prism and said roof right angle prism being constituted such that a space therebetween is variable in a direction along the reflection optical axis of the roof right angle prism; and

means for varying an observation angle (θ) which is defined by an intersected angle between said axes of said first and second ocular lens systems by rotating inwardly or outwardly together said rotatable reflection surfaces with said ocular lens systems of said observation optical systems around said rotary axis,

whereby; said observation angle (θ) can be different from said stereo angle (ω) so that the stereoscopic sense under the microscopic observation can be greater or smaller than the one under the naked eye observation.

4,702,571

INSTRUMENT FOR VISUAL OBSERVATION UTILIZING FIBER OPTICS

Forest C. Barber, 2925 Race St., Fort Worth, Tex. 76111

Continuation-in-part of Ser. No. 494,358, May 13, 1983, abandoned. This application Dec. 5, 1985, Ser. No. 805,509

Int. Cl.⁴ G02B *21/22, 23/26, 23/16*

U.S. Cl. 350—516 **4 Claims**

1. An instrument for internal visual observation comprising a main housing;

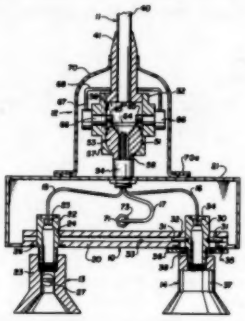
two eyepiece assemblies mounted on said main housing for binocular use;

a proximal lens system mounted in each of said eyepiece assemblies;

an elongated probe housing; flexible coupling means for connecting the proximal end of said probe housing to said main housing; said flexible coupling comprising a universal type joint enabling universal movement of said probe housing relative to said main housing;

two distal optical systems mounted at the distal end of said probe housing, having their optical axes angled relative to each other so as to provide depth perception in an area spaced from said distal end;

two elongated flexible image conducting fiber bundles extending from said main housing, through said flexible coupling, and through said probe housing to the distal end thereof; the distal ends of said two image conducting fiber bundles being connected in image transmitting association



with respective ones of said distal optical systems; the proximal ends of said two image conducting fiber bundles being connected to respective ones of said eyepiece assemblies in image transmitting association with respective ones of said proximal optical systems;

locking means for locking said universal type joint, whereby said probe housing may be positioned rigidly in a selected position relative to said housing.

4,702,572

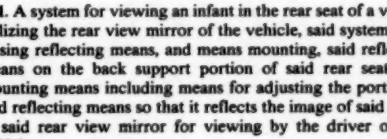
SYSTEM FOR VIEWING AN INFANT IN THE REAR SEAT OF A VEHICLE

Jackie J. Cossey, 4245 Judson, Houston, Tex. 77005

Filed Nov. 20, 1985, Ser. No. 799,799

Int. Cl.⁴ B60R *1/00, 1/04, 1/08;* **G02B** *7/18*

U.S. Cl. 350—639 **7 Claims**



1. A system for viewing an infant in the rear seat of a vehicle utilizing the rear view mirror of the vehicle, said system comprising reflecting means, and means mounting, said reflecting means on the back support portion of said rear seat, said mounting means including means for adjusting the portion of said reflecting means so that it reflects the image of said infant to said rear view mirror for viewing by the driver of said vehicle.

4,702,573

VARIABLE POWERED CONTACT LENS

David P. Morstad, 906 20th St., NW., Minot, N. Dak. 58701

Filed Aug. 25, 1986, Ser. No. 899,869

Int. Cl.⁴ G02C *7/04, 7/06*

U.S. Cl. 351—161 **6 Claims**

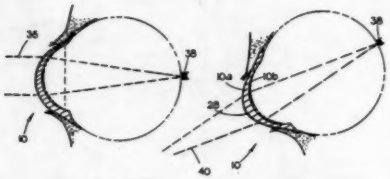
1. A contact lens for non-rotational, non-translational orientation in the eye of the wearer, comprising,

a soft, resiliently deformable opthalmic plastic material lens;

said lens having a posterior surface conforming to the corneal surface of the wearer's eye and having a perimeter area extending upon the scleral surface of the wearer's eye;

said lens having a front surface with a radius adapted to correct distance vision of the wearer;

said lens having a base-down prism on the anterior surface, with a thickness such that pressure from the lower eyelid, when the eye gazes downwardly and inwardly, will cause



the lens to resiliently deform to create a thickened bulge which reduces the radius of the lens near the center of the anterior surface;

said lens having a beveled edge on its temporal and nasal sides, said bevels being on the anterior surface of the lens adapted to form a uniform, spheric bulge when said bulge is formed;

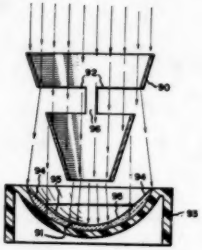
said lens having a beveled lower edge on the posterior surface for a smoother fit within the lower fornix of the eye.

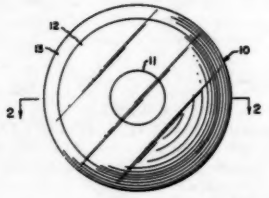
4,702,574

CONTACT LENSES HAVING FLUORESCENT COLORANTS AND APPARATUS FOR MAKING SUCH LENSES

Rajan Bawa, Fairport, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Oct. 15, 1985, Ser. No. 787,400
Int. Cl.[4] G02C *7/04;* B29D *11/00;* D06P *5/00*
U.S. Cl. 351—162 **11 Claims**





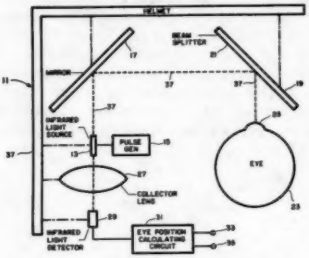
1. A contact lens comprising an optical zone, at least a portion of the optical zone being colored by a fluorescent colorant compound which fluoresces visibly in daylight.

4,702,575

HELMET MOUNTED EYE TRACKER USING A POSITION SENSING DETECTOR

Denis R. Breglia, Altamonte Springs, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 11, 1981, Ser. No. 262,153
Int. Cl.[4] A61B *3/14*
U.S. Cl. 351—210 **6 Claims**



1. An eye tracker for monitoring movement of an eye's cornea comprising, in combination:

source means having an output adapted for projecting a pulsed infrared light beam having a predetermined frequency along a first predetermined light path;

reflecting means spatially disposed downstream from said source means along said first light path adapted for redirecting said pulsed infrared light beam along a second predetermined light path, and for receiving and redirecting along said first light path a virtual image formed within said eye;

infrared beam splitting means spatially disposed downstream from said reflecting means along said second light path adapted for redirecting said pulsed infrared light beam onto the cornea of said eye that is positioned along a third predetermined light path so as to form said virtual image that changes position upon movement of the cornea of said eye, for receiving the virtual image formed within said eye, and for redirecting the virtual image formed within said eye along said second light path;

infrared sensing means positioned upstream from said source means along said first optical path, and having a field of view and an output adapted for receiving the virtual image formed within said eye, and for providing at the output thereof a plurality of square wave signals indicative of the X and Y coordinate positions of the cornea of said eye within the field of view of said sensing means; and

collecting lens means positioned between said source means and said sensing means along said first light path adapted for focusing the virtual image formed within said eye upon the field of view of said sensing means.

4,702,576

OCULAR SCATTERING ANALYZER

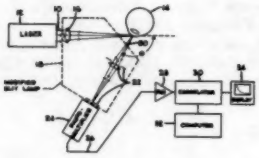
Peter C. Magnante, West Brookfield, Mass., assignor to Cambridge Instruments Inc., Buffalo, N.Y.

Filed Sep. 27, 1985, Ser. No. 780,477
Int. Cl.[4] A61B *3/10, 13/00*
U.S. Cl. 351—214 **20 Claims**

1. Apparatus for in vivo inspection of ocular tissue comprising:

(a) a slit lamp biomicroscope including an illumination optical system comprising a light source, means defining a slit of light and means for imaging the slit of light into the eye of a patient and including a viewing optical system observing light reflected from the eye illuminated by said slit of light;

(b) a laser for providing a low power, coherent and uniform output beam of light;
(c) means for introducing said laser output light beam to said illumination optical system of said slit lamp in a manner such that said laser light beam is guided to the patient's eye in a direction of said slit of light;
(d) means operatively associated with said viewing optical



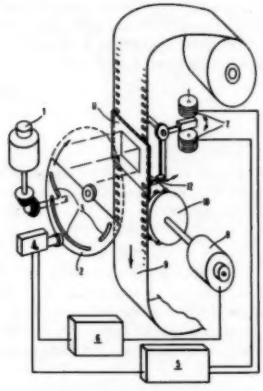
system of said slit lamp for receiving scattered laser light from the patient's eye;
(e) means for converting the scattered laser light into an electrical signal; and
(f) signal processing means for measuring time dependent fluctuations in said signal and sorting said signal into components each characterized by an intensity and a fluctuation rate.

4,702,577

FILM TRANSPORT DEVICE

Dedo Weigert, Munich, Fed. Rep. of Germany, assignor to Dedo Weigert Film GmbH, Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 641,972, Aug. 17, 1984, abandoned. This application May 23, 1986, Ser. No. 866,885
Int. Cl.[4] G03B *1/22*
U.S. Cl. 352—191 **4 Claims**



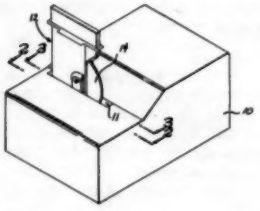
1. A film transport device for cinematographic cameras and projectors using perforated film of the kind having a rotary shutter, a shutter drive to rotate the shutter, and film-feeding means comprising engaging means for engaging perforations in the film and a stepping motor for driving said engaging means to advance the film, characterized in that the device comprises (1) film-adjusting means comprising (i) at least one adjusting pin, said pin having a camber surface and being adapted to engage and substantially completely fill the film perforation and position the film with respect to the shutter, and (ii) an electrical or electromagnetic adjusting drive, separate from any other driving mechanism of the transport device, to cause the adjusting pin to alternatively engage and release the film, and (2) central control means for controlling said film-feeding means and said film-adjusting means synchronously with said rotary shutter.

4,702,578

ALIGNMENT METHOD AND CARTRIDGE APPARATUS FOR APPARATUS FOR GENERATING COLOR TEXT AND GRAPHICS ON PHOTOGRAPHIC MEDIA

Philip G. Baker, Cupertino, and James Yurchenco, Palo Alto, both of Calif., assignors to Presentation Technologies, Inc., Santa Clara, Calif.

Filed Sep. 25, 1986, Ser. No. 912,845
Int. Cl.[4] G03B *15/24*
U.S. Cl. 354—15 **2 Claims**



1. A cartridge for an apparatus for generating color text and graphics on photographic media including an insertion cavity having walls and projections, a pivoting driving means and a locking means to selectively maintain the driving means in the disengaged position, comprising, a cartridge body portion, said body portion including means to disengage the locking means from the pivoting driving means upon insertion of the cartridge into the cavity, said cavity including guide means arranged to guide the driving means into an engaged position upon insertion of the cartridge, guide means for guiding the driving means and locking means in to their locked disengaged positions upon withdrawal of the cartridge, light shield flange means extending about the top of the cartridge, and flange means to interact with the cavity walls and projections so as to secure the position of said cartridge upon insertion.

4,702,579

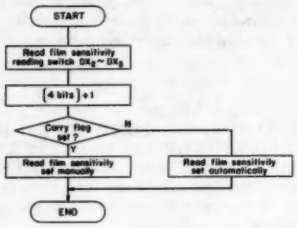
AUTOMATIC FILM SENSITIVITY CHANGE-OVER DEVICE

Masuo Ogihara; Hajime Oda; Yoichi Seki, and Hiroshi Yamazaki, all of Shikawatashi, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Aug. 15, 1985, Ser. No. 766,031
Claims priority, application Japan, Aug. 15, 1984, 59-170276
Int. Cl.[4] G03B *7/00*
U.S. Cl. 354—21 **11 Claims**

1. An automatic film sensitivity reading device for a camera of the type equipped to receive either a coded film package containing a coded film sensitivity indication or an uncoded film package containing no coded film sensitivity indication, the device comprising: reading means operative when a coded film package is loaded in the camera for reading a coded film sensitivity indication contained on the film package and producing n-bit binary data comprised of n bits having high and low logic levels representative of the coded film sensitivity indication, and operative when an uncoded film package is loaded in the camera for producing n-bit primary data com-

prised of n bits all having the same logic level; calculating means for adding one-bit binary data having the same logic level as that of the n-bit binary data corresponding to an uncoded film package to the n-bit binary data produced by the



reading means; and detecting means for detecting when a carry-over is produced by the calculating means by the addition of the one-bit binary data to thereby determine that a uncoded film package has been loaded in the camera based on the detection of the carry-over.

4,702,580

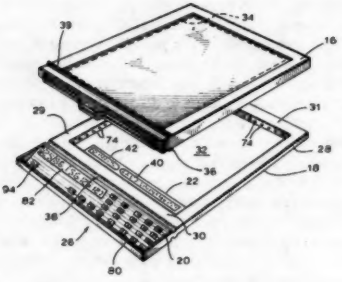
APPARATUS FOR IN-CAMERA IDENTITY MARKING OF FILM

Manuel Denner, 249 W. 29th St., New York, N.Y. 10001

Continuation of Ser. No. 860,522, May 7, 1986, Pat. No. 4,678,301. This application Mar. 5, 1987, Ser. No. 22,286

Int. Cl.[4] G03B *17/24, 17/26*

U.S. Cl. 354—106 **5 Claims**



1. In a camera having a camera body with respective front and rear ends, a background viewing screen unit carried on the rear end of said body, a film cassette for holding a rectangular-shaped strip of unexposed photographic film, said cassette being removably receivable in said body forwardly adjacent said viewing screen, and a frame member disposed in said body in front of said cassette, said frame member having a generally rectangular opening therein which registers with the strip of film and is defined by a correspondingly configured rectangular inner frame periphery, an encoder module for marking identification data on the film, the module being mountable on said frame at the inner periphery thereof and comprising

a lightproof housing, the housing having a window therein which disposes in facing confrontation with an edge portion of a cassette held film strip, and electrically operated means for generating and projecting discrete light beams of identification characters through said window onto said film strip edge portion to expose an identification image thereon, said generating and projecting means including circuit components and terminals therefor associated with operation of said generating and projecting means, said frame member having complemental terminal connector means receptive of said terminals in at least one of said frame inner peripheral sides whereby said module can be removably mounted on said one inner peripheral side and electrical power potential available at said terminal connector means communicated to said generating and projecting means for operating same, the terminal connector means being such that said terminals are slidably movable therein for selectively slidably positioning said module at plural locations along said one inner peripheral side.

4,702,581

FLASH DEVICE FOR CAMERA

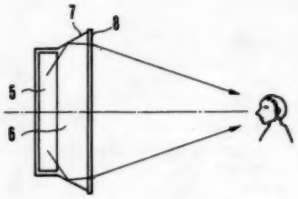
Yasuyuki Yamada, Tokyo; Yasuhisa Sato, Kanagawa; Hiroki Nakayama, Kanagawa, and Kouji Oizumi, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,629

Claims priority, application Japan, Dec. 28, 1984, 59-197487[U]

Int. Cl.[4] G03B *15/03*

U.S. Cl. 354—126 **8 Claims**



1. A flash device for a camera having a photographic lens and a photographic area of a shape definable in a longitudinal direction, comprising:

(a) flash light generating means for generating a flash light;

(b) a flash issuing opening of a shape definable in a longitudinal direction, said flash issuing opening having the longitudinal direction thereof being arranged at substantially a right angle to the longitudinal direction of said photographic area of said camera; and

(c) an optical panel provided in front of said flash issuing opening, said optical panel having at least two focal lengths of which a first focal length corresponds to a longitudinal periphery of said flash issuing opening, while a second focal length corresponds to a center of said flash issuing opening, said first and said second focal lengths satisfying the following conditions:

$$0.5 < f1/f < 1.5$$

$$f2/f < 0.5,$$

in which f1, represents said first focal length, f2 represents said second focal length, and f represents a focal length of said photographic lens.

4,702,582

PROCESSING DEVICE

Brian F. Moss, Chelford, and Richard J. Brent, Handforth, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Jun. 24, 1986, Ser. No. 877,955

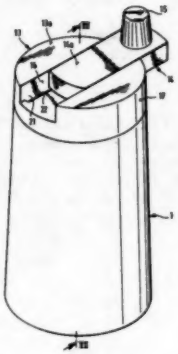
Claims priority, application United Kingdom, Jun. 25, 1985, 8516057

Int. Cl.[4] G03D *13/06*

U.S. Cl. 354—331 **7 Claims**

1. A processing device which comprises a lid; plunger means being mounted in said lid in a manner such as to be, selectively, rotatable in either direction relative to said lid, or to be locked stationary in the lid; and plunger-actuating means comprising a cap adapted to fit said lid, cap-securing means for securing said cap to said lid, said cap being associated with said plunger means for rotation therewith, a slidable member mounted on

said cap slidable between a closed and an extended position, at least one abutment member mounted on said lid, and detent means comprising at least one detent member mounted on the underside of said slidable member so that, in said extended



position of the slidable member, said cap is able to rotate on said lid, while, in said closed position of the slidable member, said detent means thereon act with said at least one abutment member on said lid to prevent the cap from rotating on the lid.

4,702,583

DRIVE DEVICE FOR LENS BARREL AND DIAPHRAGM SHUTTER

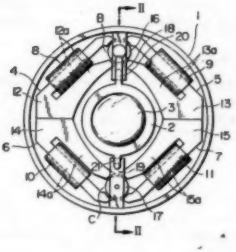
Tsunemi Yoshino, Nara; Katsuji Ishikawa, Higashiosaka, and Hajime Mitsui, Izumi, all of Japan, assignors to West Electric Co., Ltd., Osaka, Japan

Filed Dec. 1, 1986, Ser. No. 936,254

Claims priority, application Japan, Dec. 3, 1985, 60-271871

Int. Cl.[4] G03B *3/00, 9/08*

U.S. Cl. 354—400 **3 Claims**



1. A drive device for a lens barrel and a diaphragm shutter comprising:

stepping motor means including a stator and a plurality of rotors; said stator including a plurality of stator members, each having a conductor and an iron core provided with a bifurcate portion around which said conductor is wound, said stator members being assembled so that said bifurcate portions are arranged in face-to-face relationship with each other with a predetermined space interposed therebetween, said plurality of assembled stator members being disposed around a lens barrel, said respective rotors being rotatably disposed in said predetermined spaces defined between said assembled stator members;

lens moving means for moving said lens barrel in the direction of its optical axis by transmitting the rotary force of one of said plurality of rotors to said lens barrel;

diaphragm-shutter driving means for driving a diaphragm shutter provided in a body accommodating said lens barrel by transmitting the rotary force of another of said plurality of rotors to said diaphragm shutter;

control circuit means for controlling the energized states of said respective conductors on the basis of a photographic data signal supplied from a component such as a distance-metering or exposure-control unit.

4,702,584

AUTOMATIC FOCUSING CAMERA

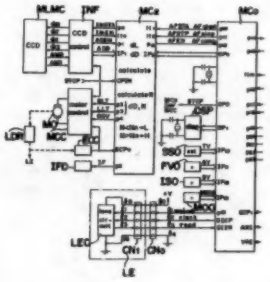
Nobuyuki Taniguchi, Tondabayashi; Takanobu Omaki, Sennan; Norio Ishikawa, Osaka; Masaaki Nakai, Kawachinagano; Tokuji Ishida, Osaka, and Masataka Hamada, Minamikawachi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 14, 1985, Ser. No. 745,305

Claims priority, application Japan, Jun. 16, 1984, 59-89673[U]; Jun. 16, 1984, 59-124168

Int. Cl.[4] G03B *3/10*

U.S. Cl. 354—400 **7 Claims**



1. An automatic focusing camera comprising:

(a) a photographic lens,

(b) means for detecting a defocus amount and a direction of movement of the photographic lens relative to a predetermined focal plane,

(c) means for driving the photographic lens toward its in-focus position corresponding to the detected defocus amount and direction of the photographic lens,

(d) means for initially stopping the photographic lens when the photographic lens is moved by the detected defocus amount,

(e) means for detecting whether the detected defocus amount is within a predetermined value,

(f) means for repeating the detection of the defocus amount and direction, and

(g) means for effecting the repetition of the detection of the defocus amount and direction when the detected defocus amount is greater than the predetermined value and moving the photographic lens towards the in-focus position and for stopping the repetition of the defocus detection when the detected defocus amount is smaller than the predetermined value.

4,702,585

ANALOG-TO-DIGITAL CONVERTER FOR CAMERA

Yoshihito Harada; Masayoshi Kiuchi; Ryuichi Kobayashi, and Masaharu Kawamura, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1986, Ser. No. 939,864

Claims priority, application Japan, Dec. 13, 1985, 60-281635

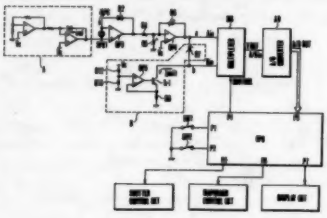
Int. Cl.[4] C03B *7/091*

U.S. Cl. 354—410 **7 Claims**

5. An analog-to-digital converter for converting an analog output signal of a light measuring circuit of a camera, which

corresponds to a luminance of an object to be photographed, into a corresponding digital signal, comprising:

(a) dividing means for dividing the output signal of said light measuring circuit into a plurality of areas relating to the luminance of the object; and



(b) an analog-to-digital converting circuit arranged to convert the photometric outputs in the respective areas divided by said dividing means into digital signals, respectively, thereby obtaining a digital value corresponding to the luminance in the respective areas.

4,702,586

COPY BOARD APPARATUS

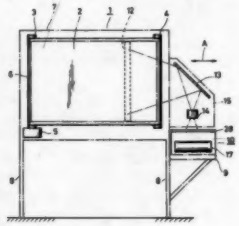
Takashi Saito, Ichikawa; Hiroshi Nitanda, Tokyo; Tsuneki Inuzuka, Yokohama; Mitsuhiro Tokuhara, Chigasaki, and Haruhisa Honda, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

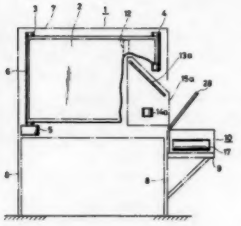
Filed Jul. 9, 1986, Ser. No. 883,653

Claims priority, application Japan, Jul. 11, 1985, 60-153018

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 R **8 Claims**





1. A copy board apparatus for copying information recorded on a writing board, said apparatus comprising:

a board section including a web forming said writing board, rollers for supporting said web such that said web extends in a plane, and driving means for driving at least one of said rollers thereby to move said web;

a copier section including an electrophotographic copier having an original carrier and a photosensitive member, said copier being disposed adjacent one longitudinal end of said writing board;

a first optical system for forming, on said photosensitive member, an image of information recorded on said web;

a second optical system for forming, on said photosensitive member, an image of an original on said original carrier; and

change-over means for effecting switching between said first and second optical systems.

4,702,587

SHELL-TYPE ELECTROSTATIC COPYING APPARATUS

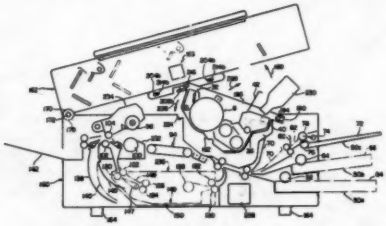
Yoshitake Miyoshi, Ikoma, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Feb. 24, 1986, Ser. No. 832,542

Claims priority, application Japan, Feb. 27, 1985, 60-36655

Int. Cl.[4] G03G *15/04*

U.S. Cl. 355—3 R **10 Claims**



6. A shell-type electrostatic copying apparatus comprising,

a supporting structure including a lower supporting frame and an upper supporting frame mounted on the lower supporting frame for pivotal movement between an open position and a closed position about a first pivot axis,

a supporting unit frame mounted on the lower supporting frame for pivotal movement about a second pivot axis which is spaced from and substantially parallel to the first pivot axis,

an endless carrier member having a peripheral surface which has a photosensitive material disposed on at least a portion thereof,

a developing device for developing a latent electrostatic image formed on the surface of the photosensitive material on the endless carrier member,

said endless carrier member and said developing device being disposed on the supporting unit frame,

a copying paper conveying mechanism for conducting a copying paper sheet from one end of the supporting structure to the other end of the supporting structure, and

a connecting means for connecting the supporting unit frame to the upper supporting frame at a location which lies between the first pivot axis and the second pivot axis; said connecting means being operable, when the upper supporting frame is pivoted in one direction about the first pivot axis toward the open position, to pivot the supporting unit frame about the second pivot axis in a direction opposite to said one direction.

4,702,588

APPARATUS FOR PRODUCING AN ELECTROPHOTOGRAPHIC PRINT

Yukio Hatabe, and Shoji Komatsubara, both of Hikone, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jan. 2, 1986, Ser. No. 815,582

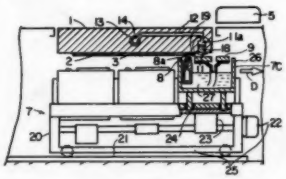
Claims priority, application Japan, Jan. 19, 1985, 60-7683

Int. Cl.[4] G03G *15/10*

U.S. Cl. 355—10 **15 Claims**

1. An apparatus for producing an electrographic print on a

photosensitive receptor placed on a holder so as to produce an electrostatic latent image on the receptor by projecting light thereon, the apparatus comprising: a developing unit located below the receptor holder, the developing unit including a developing section, at least one of the developing unit and the receptor holder being movable in relation to the other, the developing section supplying a developer to the photosensitive receptor so as to make the electrostatic latent image visible; and means for collecting used developer from the photosensitive receptor, the collecting means including a pneumatic knife



for blowing the used developer on the photosensitive receptor to a place of collection, and means for receiving the used developer blown by the pneumatic knife, the receiving means being provided as a continuous recess on an area of a surface of the receptor holder which is outside the photosensitive receptor, the receiving means being provided in a direction crossing to the direction in which the receptor holder or the developing unit is moved, the receiving means further including means, associated with said continuous recess, for sucking the used developer received therein.

4,702,589

COPYING MACHINE THAT COPIES HALVES OF A DOCUMENT ON DIFFERENT RECORDING MEDIUM SURFACES

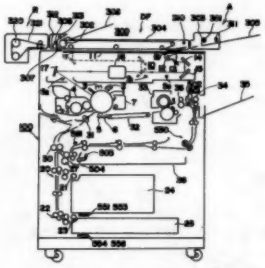
Masazumi Ito, Toyohashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 2, 1986, Ser. No. 881,250

Claims priority, application Japan, Jul. 4, 1985, 60-148074

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—14 SH **26 Claims**



1. A copying apparatus comprising:

means for designating the size of an original document to be copied;

means for copying the image of said original document onto a surface of a recording medium;

means for memorizing the size of the document just copied; and,

means for controlling said copying means to copy halves of the next original document respectively on different recording surfaces when the size of the next original document to be copied is twice the size of the document previously copied.

4,702,590

IMAGE DENSITY CONTROL APPARATUS

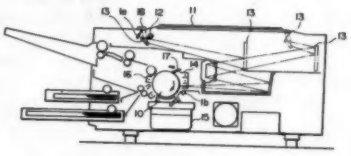
Akihiro Usami, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 511,917, Jul. 8, 1983. This application Jan. 13, 1986, Ser. No. 818,252

Claims priority, application Japan, Jul. 15, 1982, 122020

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—14 C **16 Claims**



1. An image forming apparatus comprising:

processing means for forming an image of an original on a recording member;

detection means for detecting an original image density; and

control means for controlling an operation condition of said processing means in accordance with an output from said detecting means, so as to regulate a copy image density;

the control by said control means being such that the relationship between the detected original image density and the copy image density provides a substantially constant copy image density in an intermediate original image density range and provides variation of the copy image density in accordance with the original image density above and below said intermediate original image density range.

4,702,591

CLEANING DEVICE FOR AN IMAGE FORMING APPARATUS

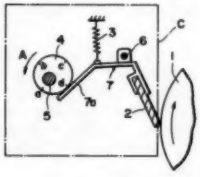
Tadayuki Tsuda, and Katsumi Kurematsu, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1985, Ser. No. 795,177

Claims priority, application Japan, Nov. 9, 1984, 59-235035; Nov. 9, 1984, 59-235039

Int. Cl.⁴ G03G *15/08*

U.S. Cl. 355—15 **4 Claims**



1. A cleaning device usable with an image forming apparatus for removing remaining toner particles from an image bearing member which is movable along an endless path, comprising;

a cleaning member contactable with a surface of the image bearing member at a position downstream with respect to the movement direction of the image bearing member, of a transfer station of the image forming apparatus where an image is transferred from the image bearing member; and

control means for contacting said cleaning member with the image bearing member to clean the image bearing member and for disengaging said cleaning member from the image bearing member when no cleaning operation is to be performed, said control means including a cam and a cam follower engageable with the cam and mechanically inter-

related with said cleaning member to move said cleaning member;

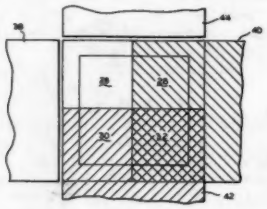
wherein upon the start of a cleaning operation, said cam follower relatively moves from a first position of said cam by way of a second position of said cam to a third position thereof, and wherein when said cam follower is in contact with the first position of said cam, said cleaning member is away from the image bearing member, when said cam follower is in contact with the third position of said cam, said cleaning member is in contact with the image bearing member, and when said cam follower is in contact with the second position of said cam, said cam cleaning member contacts the image bearing member with a greater force than when said cam follower is in contact with the third position of said cam.

4,702,592

RETICLE ASSEMBLY, SYSTEM, AND METHOD FOR USING THE SAME

David J. Geiger, Shelton; Sunny Lee, Milford, and Eric Busch, Hamden, all of Conn., assignors to ITT Corporation, New York, N.Y.

Filed Jun. 30, 1986, Ser. No. 879,890
Int. Cl.[4] G03B *27/42*
U.S. Cl. 355—53 **6 Claims**



1. An exposure system for use in the manufacture of semiconductor devices for exposing each of a plurality of levels of a single die or device dies of a semiconductor wafer to a pattern of radiation on a siteby-site exposure basis, said system comprising:

a source of said radiation;

a fixed reticle assembly between said source of radiation and said semiconductor wafer for patterning said radiation onto said semiconductor wafer, said fixed reticle assembly including a plurality of reticles arranged in a coplanar array, each said reticle having a respective different die exposure pattern;

optics means for focusing said selected one of said reticles onto said wafer, said reticle assembly being fixed within said optics means;

stepping means for incrementally moving said semiconductor wafer relative to said fixed reticle means for exposing each of said device dies, one at a time, in succession;

reticle selection means for exposing said wafer to the die exposure pattern of a selected one of said plurality of reticles;

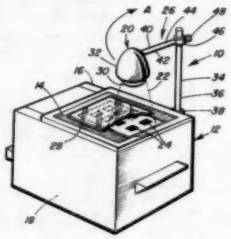
wherein said reticle selection means includes a plurality of blades, each said blade being moveable from an initial position fully overlapping said fixed reticle assembly to a selected position to expose a correspondingly selected only one of said plurality of reticles of said coplanar array or reticles in said fixed reticle assembly.

4,702,593

DENTAL DIAGNOSTIC METHOD

Steven G. Detsch, 4840 Casa Bonita Ct., Bonita, Calif. 92002

Continuation-in-part of Ser. No. 603,822, Mar. 25, 1984, abandoned. This application Mar. 17, 1986, Ser. No. 840,590
Int. Cl.[4] G03G *13/04*
U.S. Cl. 355—77 **6 Claims**



1. A method for using a conventional electrostatic type copier to copy medical x-ray negative transparencies comprising the steps of:

providing an electrostatic type copier having a copying surface;

providing a movable source of light external to said electrostatic type copier and movable light diffusing means locatable between said external movable source of light and the copying surface of said electrostatic type copier;

providing means for adjusting the light illuminance at the copying surface of said electrostatic type copier from light provided from said movable light source after said light passes through said movable light diffusing means;

adjusting the light illuminance at the copying surface of said electrostatic type copier between the predetermined limits of about 950 foot candles and about 1,425 foot candles;

locating a medical x-ray negative on the copying surface of said electrostatic type copier; and

illuminating said medical x-ray negative with light from said movable source of light which passes through said movable light diffusing means with the illuminance at the copying surface of said copier being between said predetermined limits of about 950 foot candles and about 1,425 foot candles while making a copy of said medical x-ray negative with said electrostatic type copier.

4,702,594

DOUBLE EXPOSURE INTERFEROMETRIC ANALYSIS OF STRUCTURES AND EMPLOYING AMBIENT PRESSURE STRESSING

Ralph M. Grant, Rochester, Mich., assignor to Industrial Holographics, Inc., Auburn Heights, Mich.

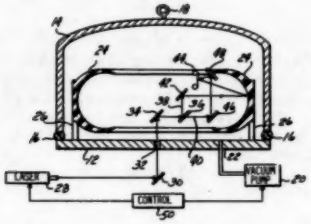
Filed Nov. 15, 1982, Ser. No. 441,719
Int. Cl.[4] G01B *9/025, 11/16*
U.S. Cl. 356—35.5 **4 Claims**

1. A method of detecting structural anomalies in an article comprising the steps of:

subjecting the article to a sudden and significant change in ambient pressure so that a surface of the article is caused to progressively creep for a prolonged period of time following the pressure change; and

during said prolonged period of time while the article continues to progressively creep, forming a successive series of double exposures on a photosensitive media of coherent

light respectively reflected from each of several sections of said article surface, whereby to provide interference



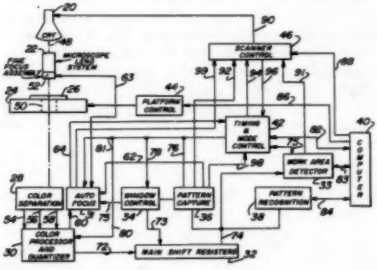
patterns on said photosensitive media for each of said several sections during one ambient pressure change.

4,702,595

PATTERN RECOGNITION SYSTEM WITH WORKING AREA DETECTION

Carl E. Mutschler, Warminster, and Mark E. Warner, Stowe, both of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Continuation of Ser. No. 197,296, Oct. 15, 1980, abandoned. This application Aug. 3, 1983, Ser. No. 519,883
Int. Cl.[4] G01N *33/48*; G06K *9/20*
U.S. Cl. 356—39 **17 Claims**



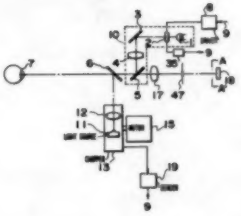
1. In a pattern recognition system for examining patterns, means to enable examination for pattern detection in a good working area, said means including scanning means for scanning a field, means for moving said field with respect to the scanning means to change the position of the field scanned, and detection means responsive to the scanning means for determining when the position of a field scanned is in a good working area, said detection means being responsive to said scanning means to determine the distribution density of patterns at each different position at which a field is scanned, said moving means responsive to said detection means for moving the position of said field with respect to said scanning means so that a first position at which a field is examined for pattern detection is in a good working area having a predetermined distribution density of patterns.

4,702,596

APPARATUS FOR MEASURING THE REFRACTIVE POWER OF AN OPTICAL SYSTEM

Masao Nohda, Kanagawa, Japan, assignor to Sun High Teck Kabushiki Kaisha, Yokosuka, Japan

Filed Oct. 28, 1985, Ser. No. 791,894
Claims priority, application Japan, Jun. 5, 1985, 60-121938
Int. Cl.[4] G01B *9/00*; A61B *3/10*
U.S. Cl. 356—126 **8 Claims**



1. In an apparatus for measuring the refractive power of an optical system, having:

at least two pairs of photoelectric converting elements;

a source of light adapted to impinge light on at least the optical system under investigation;

means for causing said ight to scan over said optical system; and

operational means for determining the refractive power on the basis of the phase differences between the output signals of said paired converting elements,

the improvement wherein said means for scanning comprises means for converting said light from said light source into a sequence of light beams each light beam being elongated in cross section and scanning said optical system in a single direction, said light beams being arranged in at least two groups with the elongated cross sections of light beams of said groups inclined at at least two different angles of inclination relative to the direction of scanning and wherein said operational means includes means for comparing the output signals received from each pair of converting elements to identify the angle of inclination of the respective light beams scanning said optical system and employing said identification in determining the refractive power.

4,702,597

PILE LAY MEASUREMENT SYSTEM

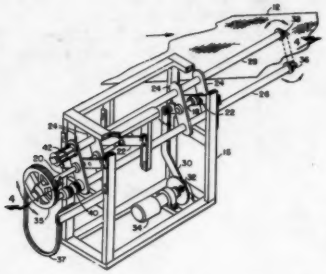
John A. Sollars, Jr., LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Mar. 31, 1986, Ser. No. 846,212
Int. Cl.[4] G01B *11/26*; G01N *21/59, 21/89*
U.S. Cl. 356—138 **5 Claims**

1. A method of measuring the pile angle of the fibers in a pile fabric comprising the steps of: supplying a pile fabric, placing a light source on one side of the pile fabric, placing a light sensor on the other side of the pile fabric, varying the transmittance of light from the light source to the light sensor in its passage through the pile fibers on the pile fabric by varying the angular position of the pile fabric, the angular position of the light source or the angular position of the light sensor and measuring the light transmittance from the light source through the pile fabric as the light transmittance is varied.

5. Apparatus to measure the angle of pile fibers on the surface of a moving pile fabric comprising: a frame, a pair of tubes spaced from another and rotably supported in said frame, said tubes being supported generally parallel to one another with each having a prism in the same corresponding end thereof, a light source in the other end of one of said tubes, a light sensor

in the corresponding end of the other of said tubes, means to supply a pile fabric between said prisms and means operably



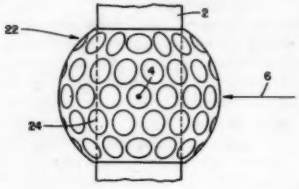
associated with said tubes to oscillate said tubes relative to the pile fabric between said prisms.

4,702,598

FLOW CYTOMETER

Ralph M. Böhmer, St. Kilda, Australia, assignor to Research Corporation, N.Y.

Filed Feb. 25, 1985, Ser. No. 704,800
Int. Cl.[4] G01N *21/47*
U.S. Cl. 356—343 **6 Claims**



1. A flow cytometer comprising:

a. means for transporting a stream of particles having cells in suspension in a substantially vertical particle stream, such that each cell passes singly in a vertical direction through an analysis zone;

b. a light source for directing a light beam to intersect said particle stream at said analysis zone, such that only a single cell is exposed to said light beam at one time;

c. an optical detection means for detecting scattered or fluorescent light pulses from each cell as it passes through said analysis zone, said optical detection means comprising a shell with a substantially spherical shape and having a substantially vertical passage therethrough, through which said substantially vertical particle stream is directed, and said analysis zone being located substantially centrally within said spherically shaped shell, and said shell having an array of apertures therein around said analysis zone, and a plurality of optical fibers being provided, with each optical fiber extending through an aperture in said spherically shaped shell to collect light at a particular radial axis defined by the radial position of the aperture in the shell, and wherein each optical fiber collects light within a collection angle defined by the diameter of the spherically shapted shell, the outer perimeter of the optical fiber, and the distance of the end of the optical fiber from said analysis zone, and each aperture includes means for adjustably securing the optical fiber passing therethrough to adjust the distance of the end of the optical fiber from said analysis zone, and thereby the collection angle of the optical fiber; and

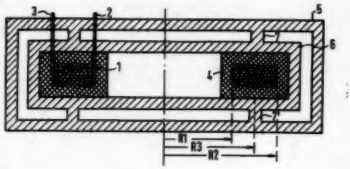
d. electronic means connected to said optical fibers for converting the light collected by said optical fibers into electrical impulses and analyzing said impulses for the desired information.

4,702,599

ROTATION RATE MEASURING INSTRUMENT

Friedemann Mohr, Renningen, Fed. Rep. of Germany, assignor to International Standard Electric Corp., New York, N.Y.

Filed Jun. 26, 1985, Ser. No. 749,062
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1984, 3425053
Int. Cl.[4] G01C *19/64*
U.S. Cl. 356—350 **15 Claims**



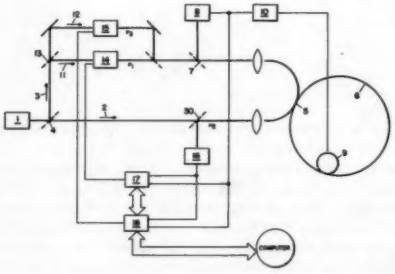
1. Rotation rate measuring instrument wherein two light beams having travelled in opposite directions over at least one closed light path formed by a coiled optical fiber are combined, and wherein the Sagnac phase difference between the two light beams is evaluated, characterized in that the optical fiber is contained in a double-walled housing, that the walls of the housing are made of a good thermal conductor, and that at least one heat bridge is provided between the walls.

4,702,600

METHOD AND APPARATUS FOR MEASURING ANGULAR RATE WITH A PASSIVE OPTICAL RESONATOR

Eberhard Handrich, Kirchzarten, and Werner Schröder, Umkirch, both of Fed. Rep. of Germany, assignors to Litef GmbH, Freiburg im Breisgau, Fed. Rep. of Germany

Filed Jul. 19, 1985, Ser. No. 757,276
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1984, 3426868
Int. Cl.[4] G01C *19/64*; G01B *9/02*
U.S. Cl. 356—350 **19 Claims**



1. A method for reading out angular rates with a passive optical ring resonator said method comprising the steps of:

(a) providing a beam of coherent light whose frequency is a resonant mode of said ring resonator cavity; then

(b) dividing said beam into first, second and third component beams; then

(c) radiating said first beam into said resonator in a first direction; then

(d) tuning the frequency of said second beam to a lower resonant cavity mode and tuning the frequency of said third beam to a higher resonant cavity mode; then

(e) alternately radiating said second and third beams into said resonator in a second opposite direction so that said first component beam simultaneously counterrotates with one of said second and third component beams to thereby excite different modes at the same time; then

(f) measuring a first frequency differential between said first and second counterrotating beams and a second frequency differential between said third and first counterrotating beams; and then

(g) calculating the angular rate as a weighted function of said first and second frequency differentials.

4,702,601

METHOD AND APPARATUS FOR MEASURING RATE OF ROTATION BY THE SAGNAC EFFECT

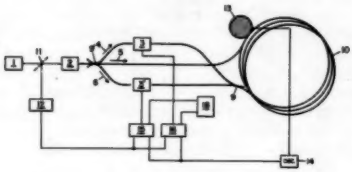
Werner Schröder, Umkirch, Fed. Rep. of Germany, assignor to LITEF GmbH, Freiburg im Breisgau, Fed. Rep. of Germany

Filed Jul. 19, 1985, Ser. No. 757,280

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1984, 3426867

Int. Cl.⁴ G01C *19/64*; G01B *9/02*

U.S. Cl. 356—350 **18 Claims**



1. A method for measuring rotation by the Sagnac effect with an interferometer comprising the steps of:

(a) providing a beam of coherent light; then

(b) dividing said beam into first, second and third component beams; then

(c) coupling said first component beam in a first direction into a fiber optic coil; and

(d) coupling said second and third component beams in a second direction through said fiber optic coil whereby said first component beam simultaneously counterrotates with said second and third component beams; and

(e) recombining said first and second counterrotating beams to form a first recombined beam and said first and third counterrotating beams to form a second recombined beam after one cycle of the coil; then

(f) directing said recombined beams to a photodetector; then

(g) measuring the phase shifts of said recombined beam pairs; then

(h) increasing the frequency of said second component beam and decreasing the frequency of said third component beam so that said phase shifts of said first and second recombined beams are each fixed modulo 2π differences; and

(i) measuring a first frequency differential between said first and second component beams and a second frequency differential between said first and third component beams; then

(j) calculating the Sagnac phase shift and the optical length of the coil from said first and second frequency differentials; and then

(k) calculating the rate of rotation from said Sagnac phase shift and said optical length.

4,702,602

DITHER MECHANISM FOR RING LASER GYROSCOPE

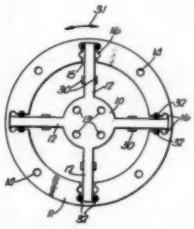
George S. Grant, Grangemouth, Scotland, assignor to Ferranti, plc, Cheadle, England

Filed Jul. 29, 1986, Ser. No. 890,366

Claims priority, application United Kingdom, Aug. 6, 1985, 8519743

Int. Cl.⁴ G01C *19/64*

U.S. Cl. 356—350 **5 Claims**



1. A dither mechanism for a ring laser gyroscope, which includes a hub arranged to be fixed to a mounting for the gyroscope, a rim coaxial with the hub and to which the gyroscope may be attached, a number of radial spokes interconnecting the hub and the rim and each having its point of attachment to the rim recessed into the rim in a radial direction, and a pair of pegs associated with at least one spoke and arranged for insertion into the recesses between the rim and the spoke on each side of the spoke so as to vary the effective length of the spoke.

4,702,603

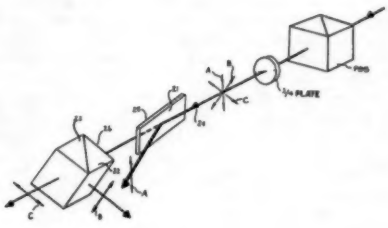
OPTICAL PHASE DECODER FOR INTERFEROMETERS

Walter H. Augustyn, Monroe, Conn., assignor to CMX Systems, Inc., Meriden, Conn.

Filed Jul. 23, 1985, Ser. No. 757,892

Int. Cl.⁴ G01B *9/02*; G01J *4/04*

U.S. Cl. 356—351 **7 Claims**



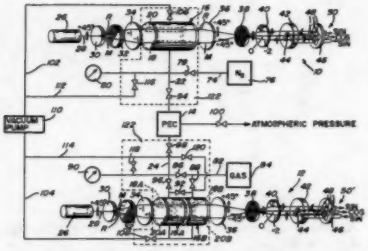
1. In an interferometer having a source of a primary beam of coherent light and means for dividing the source beam to form polarized reference and measuring beams and for recombining the reference and measuring beams, an optical phase decoder comprising a partial polarizer device for receiving the recombined reference and measuring beams to provide a first optical output beam which comprises a portion of the recombined beam, a polarizing beam splitter for accepting the remainder of the recombined beam passed by the partial polarizer to provide second and third output beams and electrical circuit means including a detector for each of the three beam outputs to provide an electrical signal proportional thereto and for measuring the phase relationships thereof.

4,702,604

PRECISE DETERMINATION OF THE COMPRESSIBILITY FACTOR OF A GAS FROM REFRACTIVE INDEX MEASUREMENTS

Jurgen H. Achtermann, Hanover, Fed. Rep. of Germany; Tapan K. Bose, and Jean-Marie St-Arnaud, both of Trois-Rivières, Canada, assignors to L'Universite du Quebec a Trois-Rivieres, Quebec, Canada

Filed Mar. 7, 1986, Ser. No. 837,290
Claims priority, application Canada, Dec. 31, 1985, 498839
Int. Cl.[4] G01N *21/41, 1/10*
U.S. Cl. 356—361 **20 Claims**



1. A method for the precise determination of the compressibility factor of a gas sample, wherein use is made of two grating interferometers coupled together with one interferometer defining a refractive index interferometer adapted to provide a signal of information related to the refractive index of said gas sample and the other interferometer defining a pressure interferometer adapted to provide another signal of information related to the pressure of said gas sample whereby to permit measurement of the refractive index as a function of pressure, each interferometer being capable of dividing a linearly polarized monochromatic laser beam into a measuring beam and a reference beam and causing said measuring beam and reference beam to travel along respective optical paths extending in close parallel relationship over predetermined optical path lengths, said refractive index interferometer and pressure interferometer comprising respectively two optical cells in tandem alignment and a single optical cell with each cell having elongated measuring and reference compartments arranged in close parallel relationship along the parallel optical paths of said measuring beam and reference beam to receive same therethrough, the measuring compartments of both cells of said refractive index interferometer being interconnected to permit gas expansion therebetween with the measuring compartment of one of said cells being connected to the measuring compartment of said single cell of said pressure interferometer via a pressure equilibrium chamber to provide said interferometer coupling, said method comprising the steps of:

(a) maintaining all said optical cells at a constant predetermined temperature value;

(b) filling the measuring compartments of said one cell and said single cell respectively with said gas sample and a selected gas at a same pressure above atmospheric pressure and allowing said gas sample and selected gas to reach thermodynamic equilibrium in said pressure equilibrium chamber;

(c) stepwise lowering the pressure of said gas sample and selected gas until substantially vacuum is attained in the measuring compartments of both said one cell and said single cell while maintaining the reference compartments thereof substantially under vacuum and recording at each step the signals of information provided by both interferometers once the thermodynamic equilibrium has been re-established in said pressure equilibrium chamber, thereby obtaining first and second sets of data;

(d) uncoupling said refractive index interferometer and pressure interferometer from one another;

(e) evacuating the measuring compartment of the other cell of said refractive index interferometer, re-filling the measuring compartment of said one cell with said gas sample at superatmospheric pressure, allowing said gas sample to reach thermodynamic equilibrium. recording the signal of information provided by said refractive index interferometer, causing said gas sample to expand into the measuring compartment of said other cell while maintaining the reference compartments of both said one cell and said other cell substantially under vacuum, and recording again the signal of information provided by said refractive index interferometer once the thermodynamic equilibrium of said gas sample has been re-established;

(f) evacuating the measuring compartments of both said one cell and said other cell, filling the measuring compartment of said other cell with said gas sample at a pressure equal to said surperatmospheric pressure of step (e), allowing said gas sample to reach thermodynamic equilibrium, recording the signal of information provided by said refractive index interferometer, causing said gas sample to expand into the measuring compartment of said one cell while still maintaining the reference compartments of both said one cell and said other cell substantially under vacuum, and recording again the signal of information provided by said refractive index interferometer once the thermodynamic equilibrium of said gas sample has been re-established;

(g) repeating steps (e) and (f) several times as paired steps after evacuation of the measuring compartment of said one cell, each of said paired steps being carried out at a different pressure above atmospheric pressure, thereby obtaining a third set of data; and

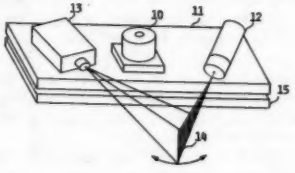
(h) processing said first, second and third sets of data obtained in steps (c) and (g) together with the temperature value of step (a) through circuitry means to obtain the compressibility factor of said gas sample.

4,702,605

ROCKER ARM SENSOR

Howard Stera, Greenlawn, and Alex Mauro, Wheatley Heights, both of N.Y., assignors to Robotic Vision Systems, Inc., Hauppauge, N.Y.

Filed Feb. 3, 1986, Ser. No. 825,203
Int. Cl.[4] G01B *11/24*
U.S. Cl. 356—375 **7 Claims**

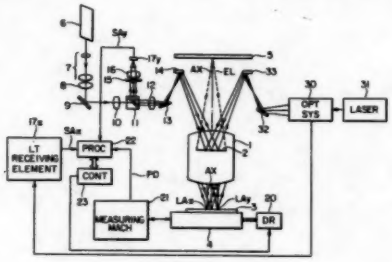


1. An arrangement for scanning the field of view of an optical three-dimensional measurement sensor comprising: a three-dimensional measurement sensor with a projector and camera, said projector and camera having optical axes; said scanning being carried out through an angle contained in a plane formed by said optical axes of said projector and said camera; a motor mounted on said sensor a mounting base; a shaft fixed to said mounting base and centrally supporting said sensor; said motor imparting a rotary motion to said shaft about an axis substantially perpendicular to the plane formed by said optical axes of said projector and camera; said rotary motion being relative to said sensor; three-dimensional measurements being obtained from triangulation of the imaged reflection of a projected light beam.

4,702,606
POSITION DETECTING SYSTEM

Toshio Matsuura, Koshigaya; Seiro Murakami; Yuji Imai, both of Tokyo; Kazuya Ohta, Kawasaki, and Akikazu Tanimoto, Yokohama, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed May 24, 1985, Ser. No. 737,434
Claims priority, application Japan, Jun. 1, 1984, 59-112370; Jun. 11, 1984, 59-119463
Int. Cl.[4] G01B *11/00*
U.S. Cl. 356—401 16 Claims



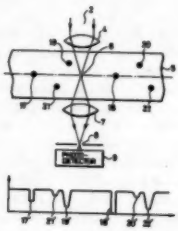
1. An alignment system including:
(a) a substrate on which a plurality of patterns are disposed, said plurality of patterns being arranged along a predetermined direction on said substrate, each of said patterns extending in a direction across said predetermined direction;
(b) a stage means for holding said substrate;
(c) applying means for applying a light spot to said substrate held by said stage means;
(d) displacing means for imparting relative displacement between said substrate held by said stage means and said light spot;
(e) light detection means for detecting light from said plurality of patterns and for producing light detection signals;
(f) positon detection means for detecting positions of said plurality of patterns along said predetermined direction in response to said light detection signals and for producing position detection signals; and
(g) operation means responsive to said position detection signals for calculating an average value of said positions of said plurality of patterns along said predetermined direction.

4,702,607
THREE-DIMENSIONAL STRUCTURE VIEWER AND METHOD OF VIEWING THREE-DIMENSIONAL STRUCTURE

Kanji Kinameri, Nishitama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 11, 1985, Ser. No. 807,686
Claims priority, application Japan, Dec. 14, 1984, 59-262778
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—432 20 Claims

1. A three-dimensional structure viewer comprising: light beam generating means for generating a plurality of light beams; light beam applying means capable of applying said plurality of light beams so as to intersect one another at a desired convergent point within a specimen; transmitted light beam strength detecting means for individually detecting the strength of said respective light beams which have passed through said specimen; scanning means for scanning either said specimen or all of said plurality of light beams; and image displaying means for displaying as an image an output from

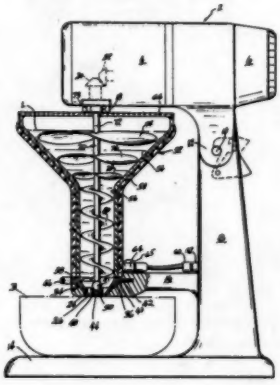


said transmitted light beam strength detecting means synchronously with said scanning.

4,702,608
DEVICE FOR MAKING CREAM

Henry J. Garbar, and Joan H. Garbar, both of 95 Winding Rd., Madison, Conn. 06443

Filed Dec. 9, 1986, Ser. No. 939,735
Int. Cl.[4] B01F *15/06, 7/24*
U.S. Cl. 366—146 7 Claims



1. An appliance for continuously making cream from a precursor mixture of milk and melted butter or oleomargarine, said appliance comprising:
(a) a stand having a base portion;
(b) means providing an electric motor mounted on said stand and spaced apart from said base;
(c) a shelf portion connected to said stand and interposed between said motor and said base portion of said stand, said shelf portion having first orifice means defining a first portion of an adjustable extrusion orifice, said first orifice means comprising alternating openings and intervening lands which are circumferentially arranged about a central axis;
(d) a reservoir removably mounted on said shelf portion and extending between said shelf portion and said motor for containing a supply of the precursor mixture, said reservoir including a cylindrical compression chamber part disposed adjacent said shelf portion and a frusto conical mixing chamber part between said compression chamber part and said motor;
(e) a movable shutter member interposed between said shelf

and said reservoir, said shutter member including second orifice means defining a second portion of said adjustable extrusion orifice, said second orifice means comprising alternating openings and intervening lands which are circumferentially arranged about said central axis and which are movable into variable degrees of registry with first recited openings and lands to vary the size of said adjustable extrusion orifice; and

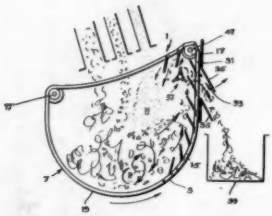
(f) rotatable screw means operably connected to said motor for continuously re-mixing and emulsifying the precursor mixture to form cream therefrom, said screw means having a remixing and stirring portion having paddles disposed in and conforming generally to the shape of said frusto conical mixing chamber part of said reservoir, and said screw means having a helical compression portion disposed in and conforming generally to the shape of said cylindrical compression chamber part of said reservoir whereby said screw means is operable to continuously prevent the precursor mixture in the mixing chamber part of the reservoir from separating into its component parts, and said screw means is further operable to continuously emulsify said precursor into cream in said compression chamber part of the reservoir and continuously extrude the cream through said adjustable extrusion orifice.

4,702,609

APPARATUS FOR MIXING ANIMAL FEED MATERIALS

Mario Houle, Wickham, Canada, assignor to Agrimetal Inc., Wickham, Canada

Filed Sep. 16, 1986, Ser. No. 907,750
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—184 **13 Claims**



1. An apparatus for mixing materials for making animal feed, said apparatus comprising:

a material mixing endless conveyor displaceable in a predetermined direction, said conveyor comprising an endless travelling belt including a plurality of elongated parallel material-mixing members extending transversely of said predetermined direction and defining an inner mixing zone, said mixing members being spaced from one another to allow feeding of materials to be mixed into said chamber, each of said mixing members having a mixing blade turned into said mixing zone for causing mixing of materials fed thereinto;

a casing;

means for mounting and supporting said endless belt and said casing at two spaced locations so that said belt defines a lower strand beneath said locations and a substantially linear upper strand between said locations, said lower strand being substantially longer than said upper strand and said strands delimiting said mixing zone said casing having an open top for feeding materials into said mixing zone through said spaces between said mixing members of said upper strand, said casing also having a bottom wall adjacent said lower strand, outwardly thereof with respect to said lower strand, outwardly thereof with respect to said zone, over which said lower strand moves along, and at least one vertical side wall; and

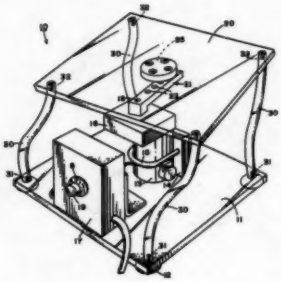
door means on said at least one vertical side wall of the casing for the discharge of mixed materials, said door means defining a discharge opening adjacent said upper strand for the egress of mixed materials.

4,702,610

UNDULATING MIXING DEVICE

Albert B. Reynolds, Jr., 6-6 Copeley Hill, Charlottesville, Va. 22903

Continuation of Ser. No. 724,530, Apr. 18, 1985, abandoned. This application Nov. 28, 1986, Ser. No. 935,790
Int. Cl.[4] B01F *11/00*
U.S. Cl. 366—213 **12 Claims**



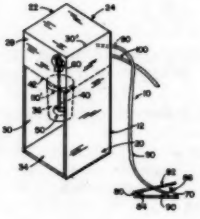
1. A mixing device which provides an undulating motion comprising: a base, a motor mounted on said base, a holding platform, pivoting means, said pivoting means rotatably mounted on said platform, an arm, said arm joined to said pivoting means and to said motor, a flexible connector means, said connector means joined to said base for supporting said platform, said connector means having an excess length and being formed from a flexible material, said length and flexibility such that said connector will bow when said platform is motionless, said connector means joined to said platform whereby said motor rotates said platform and said connector means limits the movement thereof to direct said platform in an undulating orbit.

4,702,611

CUP PROTECTING MIXER

Leonard S. Crossley, 3218 Nebraska Ave., Council Bluffs, Iowa 51501

Filed Oct. 3, 1985, Ser. No. 783,489
Int. Cl.[4] B01F *7/16*
U.S. Cl. 366—325 **13 Claims**



1. A mixer for mixing solid ingredients into cold and stiff ice cream, said mixer having a frame, said frame being open on its forward side to receive a cup, a mixing head disposed rearwardly of said open forward side, said mixing heat rotating about a substantially vertical axis, said head having a central portion surrounding said axis, a shaft projecting upwardly from and fixed to said central portion, a driving means

mounted on said frame and supporting and driving said shaft for rotation about said axis, a plurality of blades attached to said central portion, said blades criss-crossing one another and being transverse to one another in frontal elevation and projecting from said central portion and away from said axis above and below a horizontal plane at a right angle to said axis through said central portion and arranged sequentially around said axis, each of said blades when seen from a direction at a right angle to said axis being generally inclinedly disposed with respect to said axis, each said blade having a lower end section having a lowermost surface area which latter is substantially entirely disposed at an inclination substantially closer to the horizontal than is the general inclination of portions of the underside of the respective blade which are disposed upwardly thereof and on the underside of a horizontal plane through the center of said head and disposed inwardly toward said axis therefrom whereby said blades do not tend to damage the bottom of a cup when the latter is engaged thereby, and operator-controllable speed control means correlated with said driving means whereby said head can be driven at multiple speeds, said blades having blunt outer ends for reducing the danger of puncturing the sides of a cup.

4,702,612

COMPASS-WATCH CASE

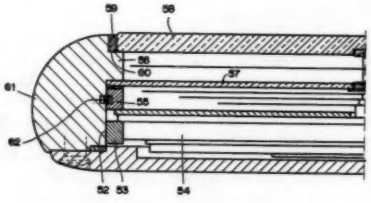
Hansjörg Finger, Lengnau, Switzerland, assignor to Firma H. Finger, Switzerland

Filed Jun. 30, 1986, Ser. No. 880,194

Claims priority, application Switzerland, Jul. 10, 1985, 2988/85

Int. Cl.⁴ G04B *47/00*

U.S. Cl. 368—10 **9 Claims**



1. A compass assembly comprising a first plate of transparent material and a second plate rigidly fixed with respect to said first plate, said first and second plates having parallel planar inner faces facing one another and spaced apart, said first plate having a first passage formed therein with an opening in the inner face of said first plate; a first bearing assembly mounted within said first passage and comprising a first drilled jewel and a first end portion, said first drilled jewel comprising a first drilled portion with a first cylindrical borehole having a first inner edge which lies farther from the inner face of said second plate then does the inner face of said first plate; a second bearing assembly secured to said second plate and being coaxial with said first bearing assembly, said second bearing assembly comprising a second drilled jewel and a second end portion; an arbor having two pivots provided at opposite ends thereof, each of said pivots including a cylindrical portion, said cylindrical portions being received within said first and second drilled jewels; and a compass needle formed integrally with said arbor and extending between the inner faces of said first and second plates.

4,702,613

ELECTRONIC TIMEPIECE DRIVEN BY A PLURALITY OF STEPPING MOTORS AND POWERED BY A SOLAR CELL

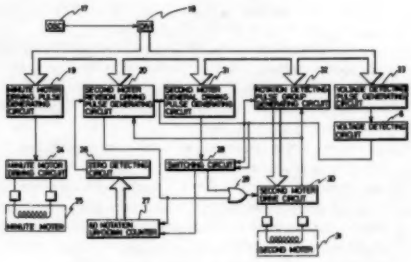
Shuzi Ohtawa, Tokyo, Japan, assignor to Seiko Instruments & Electronics Ltd., Tokyo, Japan

Filed Mar. 4, 1986, Ser. No. 835,969

Claims priority, application Japan, Mar. 5, 1985, 60-43243

Int. Cl.⁴ G04C *23/00*

U.S. Cl. 368—66 **19 Claims**



1. An electronic timepiece comprising: oscillating means for generating a time standard signal; dividing means for receiving said time standard signal and generating a plurality of divided signals; a plurality of pulse generating means for receiving said divided signals and generating a plurality of driving pulses; a plurality of driving means for receiving said driving pulses; a plurality of step motors each driven by said driving means; a plurality of hands driven by respective ones of said step motors for indicating time; energy supplementary means for generating electric energy; accumulating means for storing said electric energy; detecting means for detecting an output voltage of said accumulating means representative of the amount of the electric energy stored in the accumulating means and generating a detection signal effective to suspend at least one of said step motors when the output voltage becomes below a predetermined value; counting means for counting the suspension time during which the step motor is suspended; and control means for correcting the position of the step motor after cancellation of suspension thereof to position the hand driven thereby to indicate the present time according to an output from said counting means.

4,702,614

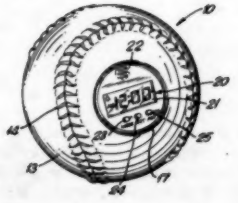
BASEBALL ALARM CLOCK

Michael C. Copley, La Jolla, and Alonzo W. Clark, IV, Poway, both of Calif., assignors to Off-The-Wall Products, New York, N.Y.

Filed Jul. 8, 1986, Ser. No. 883,510

Int. Cl.⁴ G04B *37/12*; G04C *21/16*

U.S. Cl. 368—72 **8 Claims**



1. An electronic alarm clock having an audio alarm which is

quieted when the alarm clock is thrown against a wall, said alarm clock comprising:

(a) a generally spherical-shaped casing having a flexible and resilient core and an external cover having an opening therein;

(b) a recess in said core extending from said cover partially into said core;

(c) an electronic alarm clock assembly mounted within said recess, said assembly having an electric battery and a digital liquid crystal time display normally visible through said opening in said cover without disassembling said spherical-shaped casing, said time display being substantially flus with said cover;

(d) control means for controlling the functions of said clock, said control means being operatively associated with said alarm clock assembly and being normally visible and accessable through said opening without disassembling said spherical-shaped casing;

(e) a printed circuit board including an alarm quiet means for silencing said alarm; and

(f) a switch means electrically connected to said alarm quiet means and disposed within said core, said switch means being a deceleration inertial switch operative upon impact when said alarm clock is thrown against a wall to activate said alarm quiet means and silence said alarm.

4,702,615

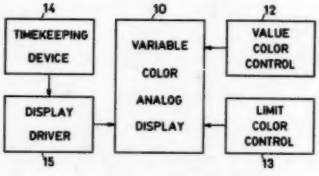
ANALOG DISPLAY TIMEPIECE

Karel Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada M6S 4T2

Continuation-in-part of Ser. No. 946,036, Dec. 24, 1986. This application Mar. 26, 1987, Ser. No. 30,470

Int. Cl.[4] G04C *19/00*; **B04B** *19/00*

U.S. Cl. 368—82 **9 Claims**



1. A method of simultaneously indicating a measured value of time and its relation to a predetermined time limit, on a single variable color analog display means, by causing an analog indication of time to be exhibited on said display means and by controlling the color of said indication in accordance with the relation of said value of time to said time limit.

4,702,616

CLOCK

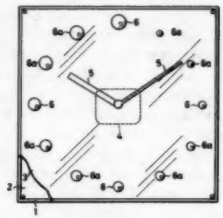
Hiroyuki Kizawa, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan

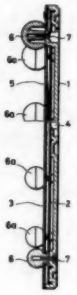
Filed Jun. 19, 1986, Ser. No. 876,372

Claims priority, application Japan, Jun. 19, 1985, 60-92486[U]; Jun. 19, 1985, 60-92488[U]

Int. Cl.[4] G04B *19/00, 19/06*

U.S. Cl. 368—223 **11 Claims**





1. In a clock having a capsule in which a timepiece movement is incorporated, an install plate on which said capsule is fixedly attached, a dial disposed in front of said install plate, a transparent front cover disposed in front of said dial, and hands disposed in a gap between said front cover and said dial and driven by said movement, the improvement comprising: decorations fixedly attached on a front surface of said front cover in an exposed state and disposed on a peripheral portion of the front cover to define a time reference member such that the hands rotate relative to the time reference member to indicate time; and means extending downwardly from the decorations through said front cover to contact with a front surface of said dial upon deformation of the dial and the front cover.

4,702,617

CHILL TEMPERATURE METER WITH SELECTABLE RESPONSE

Austin A. Crabtree, Rte. 4, Box 265; James R. Crabtree, Rte. 4, Box 254, and Jeffrey Crabtree, Rte. 4, Box 318, all of Rockwood, Tenn. 37854

Filed Mar. 10, 1986, Ser. No. 838,284

Int. Cl.[4] G01K *3/00*; **G06F** *15/20*

U.S. Cl. 374—109 **9 Claims**

1. A chill temperature meter with selectable response for determining and displaying a number corresponding to said chill temperature, which comprises:

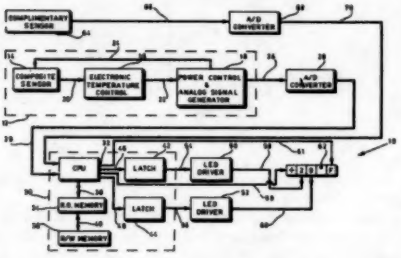
a composite sensor that is responsive to prevailing composite environmental factors of wind velocity, real temperature, humidity, and solar radiation, said sensor provided with a temperature-controlled element maintained at a selected temperature, said sensor providing an analog output signal

related to electrical power required to maintain said selected temperature that is related to the composite effects of said environmental factors;

an analog-to-digital converter means for converting said analog output signal of said composite sensor into a first digital signal;

at least one complimentary sensor adapted to sense one of said enviornmental factors, said complimentary sensor providing an analog signal related to said factor;

further analog-to-digital converter means for producing a second digital signal derived from said analog signal of said complimentary sensor;



high speed signal processor means for periodically taking samples of said first digital signal, for producing an average signal of said samples of said first digital signal, for selectively modifying said average signal by said second digital signal using a pre-selected response relationship, and for producing a binary coded decimal output signal corresponding to said modified average signal of said samples;

circuit means for converting said binary coded decimal output signals into a seven segment code; and

display means responsive to said seven segment code for displaying a digital number corresponding to said chill temperature.

4,702,618

RADIOMETER

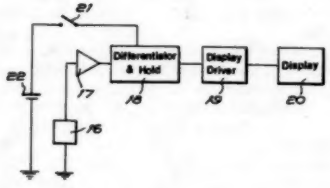
John K. Maund, Birmingham, England, assignor to Admiral Design and Research Limited, Bristol, United Kingdom

Filed Feb. 5, 1985, Ser. No. 698,293

Claims priority, application United Kingdom, Feb. 18, 1984, 8404343

Int. Cl.[4] G01J *5/04*

U.S. Cl. 374—121 **5 Claims**



1. A thermal radiometer comprising:

a housing,

a shutter mounted on a wall of the housing, said shutter having an outer thermally reflective surface and an inner surface,

a thermally conductive element located within said housing and positioned behind the shutter, said conductive element having a black surface facing the inner surface of said shutter,

means for measuring the temperature of the conductive element, and

indicator means responsive to said measuring means for displaying a value which is proportional to the rate of temperature rise of the conductive element after opening the shutter.

4,702,619

TEMPERATURE SENSORS

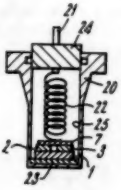
Philip G. Camp; Eric D. Macklen; Victor H. R. Hole, and David R. Hutcherson, all of Somerset, England, assignors to Standard Telephones and Cables Public Limited Company, London, England

Continuation of Ser. No. 568,404, Jan. 5, 1984, abandoned. This application Dec. 12, 1985, Ser. No. 808,363

Claims priority, application United Kingdom, Mar. 22, 1983, 8307913

Int. Cl.[4] G01K *13/00, 7/22;* **G01D** *13/22*

U.S. Cl. 374—144 **10 Claims**



9. A temperature sender for sensing the temperature of an internal combustion engine having a cylinder head, said engine having a range of normal or expected operating temperature fluctuations when in use, said sender comprising:

a hollow-screw-threaded plug for screwing into an appropriate hole in the cylinder head;

a thermistor composite for connection to a temperature indicating device having an indicator capable of responding to thermistor resistance, said composite having a resistance which varies significantly with temperature;

a spring resiliently compressing the composite in the plug;

an insulating member closing off the plug;

a connection tag carried by the insulating member and providing a conductive lead from the spring; and

the thermistor composite comprising thermistors in good heat transfer relationship with each other and having a resistance/temperature characteristic curve having a plateau extending over a range of temperatures corresponding to said range of expected or normal engine temperature fluctuations whereby a change in indication by said indicator in response to changes in engine temperature below or above said range of normal operating temperature fluctuations is permitted and change in indication of said indicator in response to changes in engine temperature within said range of normal operating temperature fluctuations is substantially limited.

4,702,620

METHODS OF AND APPARATUS FOR TESTING INTERNAL COMBUSTION ENGINES BY MONITORING THE COOLING SYSTEMS THEREOF

Curtis A. Ford, Jamaica, N.Y., assignor to Autotec International, Inc., St. Albans, N.Y.

Continuation-in-part of Ser. No. 719,883, Apr. 4, 1985, abandoned. This application Apr. 29, 1986, Ser. No. 857,220

Int. Cl.[4] G01K *3/04*

U.S. Cl. 374—145 **14 Claims**

1. An apparatus for testing the condition of liquid cooling

systems of internal combustion engines, wherein a thermostat is disposed in coolant of a cooling system between a radiator and an engine, the device comprising:

a heat sensor for placement in the coolant between the radiator and thermostat;

time counting means for counting a preselected time interval selected to correspond to the time interval in which the coolant should reach a first preselected heat level;

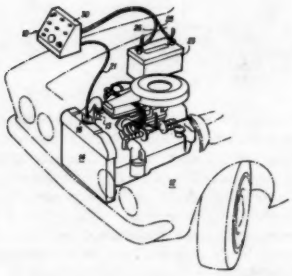
means connected to the time counting means for starting operation thereof upon commencing testing of the cooling system;

an under-range switch means connected to the heat sensor for detecting when the cooling system reaches the first preselected temperature;

a first indicating means for indicating that the coolant has reached the first preselected heat level;

relay means connected to the under-range switch, the time counting means and the first indicating means for interrupting operation of the first indicating means if the time counting means signals an end to the time interval before the under-range switch detects that the sensor has reached the preselected heat level;

second indicating means for providing a defect signal when the time counting means signals the end of the first preselected time interval;



first connecting means for connecting the second indicating means to the time first connecting means, said counting means including second relay means connected between the second indicating means and time counting means and being connected to the under-range switch for interrupting transmission of the time interval signal to the second indicating means to prevent issuance of a defect signal;

outer-range switch means connected to the heat sensor for detecting when the coolant reaches at least one upper heat level limit higher than the first preselected temperature;

at least one additional indicating means for indicating that the upper temperature limit has been reached,

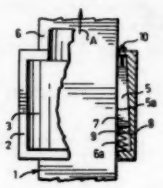
second connecting means for connecting the outer range switch means to the additional indicating means; said second connecting means including third relay means connected between the additional indicating means and outer-range switch means for interrupting operation of the addition indicating means if the outer-range switch means does not detect that the coolant has reached the upper heat level limit, whereby the first, second and third relay means enable the associated indicating means to indicate a condition of the cooling system if that condition is indicative of the true state of the cooling system and interrupt an associated indicating means if the condition indicated by the indicating means is not indicative of the true state of the cooling system.

4,702,621

BEARING ARRANGEMENT FOR A FEEDING DEVICE FOR A DRILLING MACHINE

Jarmo Heinonen; Risto Wisakanto, and Rolf Ström, all of Tampere, Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed Dec. 24, 1985, Ser. No. 813,014
Claims priority, application Finland, Jan. 18, 1985, 850232
Int. Cl.[4] F16C *29/12*
U.S. Cl. 384—37 **2 Claims**



1. A bearing arrangment for a feeding device of a drilling machine, comprising

a feeding beam having a plurality of longitudinal guides,

at least one carriage being displaceable on said guides for supporting of the drilling machine, said carriage being provided with a plurality of guide surfaces for engagement with the guides,

moving means for movement of the carriages along said guides,

at least one guide surface of the carriage is formed by at least one spacer supported by the carriage,

the spacer being pressed against at least one wedging surface provided within the carriage and extending in a substantially parallel direction to said at least one longitudinal guide, the wedging surface approaches a guide surface of the guide in a drilling direction of the carriage.

the carriage having displacing means for displacement of the spacer between the guide surface of the feeding beam and the wedging surface of the carriage,

said displacing means automatically pressing the spacer along the wedging surface enabling the spacer to move along said longitudinal guide without any substantial clearance, and

whereby a growth of the clearance caused by wearing of the spacer and the guide is avoided as the wearing increases, said displacing means being a spring mounted between the carriage and the spacer, said spring displacing the spacer with respect to the carriage in the drilling direction.

4,702,622

LINEAR SLIDE ROLLER BEARING UNIT

Hiroshi Teramachi, 2-34-8, Higashi-Tamagawa, Setagaya-ku, Tokyo, Japan

Continuation of Ser. No. 882,447, Jul. 7, 1986, abandoned, which is a continuation of Ser. No. 684,707, Dec. 21, 1984, abandoned.
This application Mar. 6, 1987, Ser. No. 22,492
Claims priority, application Japan, Dec. 29, 1983, 58-248789
Int. Cl.[4] F16C *29/06*
U.S. Cl. 384—44 **3 Claims**

1. A linear slide bearing unit comprising:

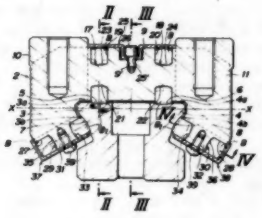
an elongated track shaft having left and right ridges projected laterally from both sides thereof and extending along the length thereof, each ridge being provided at each of its sides with a first loaded roller rolling surface directed vertically upward and a second loaded roller rolling surface directed obliquely downward;

a bearing block mounted on said track shaft for movement along the length of said track shaft, said bearing block being composed of a central section and two end plates, said central section having an upper horizontal flat portion

and skirts depending from both sides of the upper horizontal flat portion, said upper horizontal flat portion being provided in its upper and lower sides with two pairs of non-loaded roller grooves and loaded roller grooves, said skirts having slanted lower end surfaces directly inwardly and downwardly, and said slanted lower surfaces being provided at their midportions with longitudinally extending guide ridges and at one side of said guide ridges with loaded roller rolling surfaces opposing to the obliquely downwardly directed loaded roller rolling surfaces on said track shaft and at the other sides of said guide ridges with non-loaded roller rolling surfaces, said end plates being attached to the longitudinal ends of said central section and each having four semicircular turning grooves each of which is connected at their one end with the corresponding one of said loaded roller grooves or surfaces in said bearing block central section and at their other end with the corresponding one of said non-loaded roller grooves or surfaces in said bearing block central section to form four endless tracks;

four roller trains comprising rollers interposed between the opposing loaded roller grooves in said bearing block and the loaded roller rolling surfaces on said track shaft and disposed on the non-loaded roller rolling grooves and the non-loaded roller rolling surfaces on said bearing block, each of said track shaft ridges being clamped by two trains of said rollers disposed on said first and second loaded roller rolling surfaces of each ridge;

side roller retainers secured to the end surfaces of said guide ridges of said skirts and adapted to guide and retain the



rollers disposed on said loaded roller rolling surfaces and non-loaded roller rolling surfaces formed at both sides of respective guide ridges, each of said side roller retainers having a substantially L-shaped cross section having a flat side panel and a peripheral portion which includes a straight portion extending alone one longitudinal edge of said side panel and curved portions of semicircular sectional shape connected to opposite ends of said straight portion, said side panel being secured to the corresponding one of said guide ridge end surfaces, the straight portion of said peripheral portion cooperating with the corresponding one of said non-loaded roller rolling surfaces on one side of said guide ridges to form a non-loaded roller passage, the curved portions of said peripheral portion being adapted to cover the corresponding semicircular turning grooves in said end plates to form roller-turning passages; and

an upper roller retainer secured to the upper surface of said bearing block and adapted to guide and retain said rollers disposed in the non-loaded roller rolling grooves formed in the upper surface of said bearing block, said upper roller retainer having a flat portion and guide portions formed integrally with said flat portion to project from opposite ends thereof, said flat portion of said upper roller retainer being secured to the upper surface of said bearing block central section so as to cover said non-loaded roller grooves to form non-loaded roller passages, said guide portions of said upper roller retainer being of a semicircular sectional shape and adapted to cover the corresponding semicircular turning grooves in said end plates to form roller-turning passages.

4,702,623

LINEAR BEARING FOR CONTINUOUS LONGITUDINAL MOVEMENT

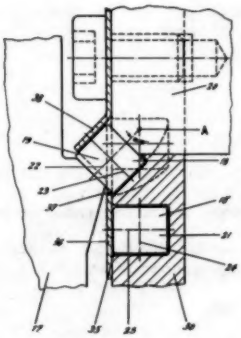
Denis Borel, Wallisellen, Switzerland, assignor to SRO Kugellagerwerke, J. Schmid-Roost, Switzerland

Filed Sep. 30, 1986, Ser. No. 913,778

Claims priority, application European Pat. Off., Oct. 1, 1985, 85112399.2

Int. Cl.⁴ F16C *29/06*

U.S. Cl. 384—45 **16 Claims**



1. A linear bearing for continuous longitudinal movement comprising:

a housing which defines at least one closed roller orbit for accommodating a plurality of rollers, each said roller orbit having an inner surface defining the inside surface of said roller orbit and facing outwardly of the orbit and an outer surface defining the outside surface of said roller orbit and facing inwardly of the orbit,

each said roller orbit further comprising a load zone and a return travel zone which are interconnected at two ends thereof by respective reversal regions, and

at least part of the load zone being defined by a raceway located in the housing adjacent to the load zone, for applying a load to such rollers when they are accommodated in each said roller orbit, said raceway forming part of said outer surface of each said roller orbit.

4,702,624

FLANGED HALF BEARING

Mario Fontana, Cuorgnè , Italy, assignor to Federal-Mogul Corporation, Southfield, Mich.

Division of Ser. No. 624,901, Jun. 26, 1984, Pat. No. 4,644,624. This application Jun. 23, 1986, Ser. No. 877,055

Claims priority, application Italy, Jul. 21, 1983, 67789 A/83

Int. Cl.⁴ F16C *9/02, 33/14*

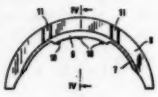
U.S. Cl. 384—294 **6 Claims**

1. A flanged half bearing, comprising:

A plain half bearing having an axially extending outer surface portion; and

at least one thrust flange disposed over and rigidly connected to said axially extending outer surface portion of said plain half bearing by a projection weld, said projection weld being formed with collapsable radial projection

means provided on said at least one thrust flange such that said projection weld prevents deformation of said plain



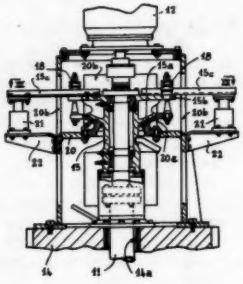
half bearing and prevents deformation of said at least one thrust flange during formation of said projection weld.

4,702,625

CENTRIFUGAL DECANTERS OF THE PENDULUM TYPE

Jean-Pierre Davier, Lyons, France, assignor to Robatel Slpi, Genas, France

Filed Jan. 29, 1986, Ser. No. 823,860
Claims priority, application France, Feb. 8, 1985, 85 02012
Int. Cl.[4] F16C *27/08*
U.S. Cl. 384—428 **3 Claims**



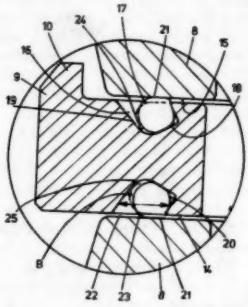
1. In a pendulum-type centrifugal decanter having a vertical drive shaft suspended downwardly within a frame from a motor mounted to the frame in which a roller bearing sleeve is mounted so as to encircle the drive shaft, the roller bearing sleeve being adjustably mounted with respect to a vertically oriented concave bearing surface which is secured to the frame by a plurality of vertically oriented first shock absorber members which are mounted within the frame and around the drive shaft and roller bearing sleeve so as to permit limited pendular movement of the vertical drive shaft, the improvement comprising a plurality of second shock absorber means which are vertically oriented and mounted to the exterior of the frame, a plurality of horizontally extending beams having inner and outer ends extending outwardly from within the frame, said beams being secured at their inner ends to the roller bearing sleeve, said second shock absorber means being connected to said outer ends of said beams whereby said second shock absorber means reduce the amplitude of displacement of the drive shaft during periods when the frame is subjected to increased disturbances.

4,702,626

SEALING ROLLING BEARING

Herbert Scholl, Schweinfurt, and Uwe Brockmüller, Oberwerrn, both of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Dec. 11, 1986, Ser. No. 940,583
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544988
Int. Cl.[4] F16C *33/78*
U.S. Cl. 384—477 **14 Claims**



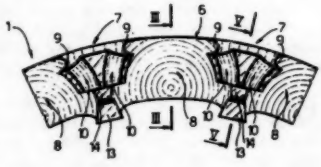
1. In a sealed rolling bearing with at least one bearing ring having an annular radially extending end surface, a support ring having an annular radially extending support surface adapted to be brought into operative engagement with said end surface, and a circumferentially closed axially elastic sealing ring inserted in an annular groove in one of said end surface or said support surface that is axially opposite the other of said end surface or support surface, the sealing ring providing sealing contact with axial prestress about its circumference between a bottom surface of said annular groove and the other of said end surface or support surface; the improvement wherein said the sealing ring is also elastically yielding in the circumferential direction, and the annular groove has a groove bottom and a radial wall that is inclined to the bearing axis and extends to said groove bottom, the sealing ring being elastically stressed against said inclined wall of the annular groove.

4,702,627

BEARING BALL SPACING RETAINER

Giovanni Pollastro, Turin, Italy, assignor to Riv-Skf Officine Di Villar Perosa S.p.A., Turin, Italy

Filed Dec. 3, 1985, Ser. No. 804,351
Claims priority, application Italy, Dec. 4, 1984, 54107/84[U]
Int. Cl.[4] F16C *27/00*
U.S. Cl. 384—526 **9 Claims**



1. Spacing retainer for a ball bearing having an inner and an outer race, said retainer having a central axis and being made of elastically-formable, synthetic material, said retainer being effective to position bearing balls, with gaps therebetween, in equally spaced manner about a notional circle whose center lies in said central axis and whose circumference passes through centers of said bearing balls; said retainer comprising

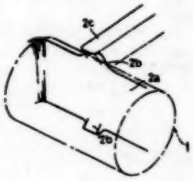
a ring, a number of parts projecting from said ring in direction of the retainer axis, a number of seats for said balls, each seat comprising a spherical surface portion formed in said ring between two adjacent said projecting parts, each of said projecting parts comprising (a) a pair of elastically-deformable tabs located externally of said notional circle, (b) a tooth located within said notional circle, and (c) a notch between said tabs and tooth to separate said tabs from said tooth and being located essentially on said notional circle, clearance between two adjacent bearing balls being minimized by virtue of said tooth alone being housed in a gap between said two adjacent bearing balls, the size of said tooth being substantially smaller than the size of said tabs in a direction tangential with the retainer.

4,702,628

ROLLER RETAINING ASSEMBLY

Hitoshi Watanabe, Mino, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Mar. 4, 1986, Ser. No. 836,021
Claims priority, application Japan, Mar. 5, 1985, 60-30305[U]
Int. Cl.[4] F16C *33/46*
U.S. Cl. 384—580 **2 Claims**



1. A roller retaining assembly for use in a roller bearing, comprising:

retaining means generally cylindrical in shape and including a plurality of retainer windows generally rectangular in shape and arranged spaced apart one from another in a circumferential direction of the cylindrical retaining means, said retaining means including a pair of outer retaining projections and a pair of inner retaining projections, each of said projections projecting from a wide wall of and associated one of said retainer windows;

a plurality of rollers each of which is received in the associated one of said plurality of retainer windows;

whereby each of said plurality of rollers has a diameter and a length which is slightly smaller than a width and a length of said associated retainer window, and the diameter of said roller is greater than a shortest distance between the pair of outer retaining projections and also between the pair of inner retaining projections;

wherein said retaining means includes a retainer ring which is provided with a central ridge at an outer peripheral surface thereof between the two adjacent retainer windows, and both ends of said central ridge are plastically deformed to define said outer retaining projections which project generally inwardly of said retaining window, and said retainer ring has a thickness which is slightly smaller than the diameter of said rollers; and

wherein said outer peripheral surface of said retainer ring is provided with a pair of grooves spaced apart from each other in the axial direction of said retaining ring, thereby forming said central ridge between said pair of grooves; and

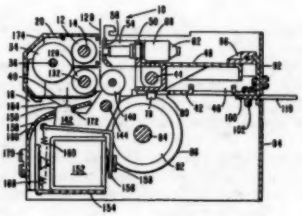
wherein a gap between said roller and said retainer window in an axial direction of said roller is such that, when said roller is located at its outermost or innermost position as being inclined with respect to the axial direction of said retainer ring, a periphery of one end surface of said roller is in contact with a side wall of said retainer window and a periphery of the other end of said roller is not in contact with a side wall of said retainer window.

4,702,629

APPARATUS FOR ADJUSTING THE PRINT HEAD GAP IN A DOT MATRIX PRINTER

Tsutomu Hamano, Odawara, and Hiroshi Shikano, Nagoya, both of Japan, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 9, 1985, Ser. No. 806,718
Claims priority, application Japan, Dec. 28, 1984, 59-282139
Int. Cl.[4] B41J *11/20*
U.S. Cl. 400—56 **10 Claims**



1. A dot matrix printer comprising a

platen pivotally supported by the printer,

first supporting means comprising a carriage having individual housings for and supporting a plurality of spaced, transversely aligned print elements and movable transversely across the printer and along the platen, each of the print elements having a printing wire actuated to be moved toward and away from the platen,

roller means for supplying ink onto the surface of the platen,

means for guiding record media along a path between the platen and the first supporting means and being spaced from the platen, the movement of each of the printing wires pressing the record media against the platen for printing on the opposite side of the media from the printing wires,

first drive roller means supported by the printer,

second drive roller means opposed to said first drive roller means and cooperable with said first drive roller means to selectively drive the record media,

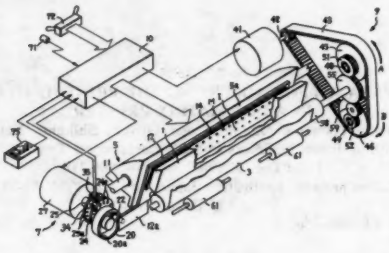
second supporting means comprising a base plate operably connected for supporting the first supporting means for moving said first supporting means toward and away from the platen and having shaft means enabling transverse movement of the first supporting means along the platen, said base plate having rollers thereon engageable with the first drive roller means providing predetermined space for passage of the record media between the platen and the printing wires, and

means operably associated with the second supporting means for urging said second supporting means toward the platen and for moving the second supporting means along with the first supporting means away from the platen to permit insertion of the record media between the platen and the print wires.

4,702,630
FACSIMILE-PRINTER APPARATUS

Hisashi Igi; Tomohiro Yamada; Tomohisa Higuchi, all of Nagoya; Eiichi Ohta, Handa, and Hiroaki Yazawa, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 23, 1986, Ser. No. 877,410
Claims priority, application Japan, Jun. 26, 1985, 60-142090
Int. Cl.[4] B41J *3/54;* H04N *1/21*
U.S. Cl. 400—82 6 Claims



1. A facsimile-printer combination of a dot-matrix type, comprising:

first printing means operable in a fascimile mode according to first printing information, for selectively producing first dots on a recording medium, at a first printing pitch in metric unit in a direction of width of said recording medium;

first feeding means operable in association with said first printing means, for feeding said recording medium at a first feeding pitch in the metric unit in a direction of length of said recording medium;

second printing means operable in a printer mode according to second printing information, for selectively producing second dots on said recording medium, at a second printing pitch in inch unit in said direction of width;

second feeding means operable in association with said second printing means, for feeding said recording medium at a second feeding pitch in the inch unit in said direction of length;

input means for receiving said first printing information and said second printing information from output means; and

selector means, connected to said input means, said first printing and feeding means, and said second printing and feeding means, for rendering operable said first printing means and said first feeding means when said first printing information is received by said input means, and rendering operable said second printing means and said second feeding means when said second printing information is received by said input means.

4,702,631
THERMAL RIBBON CASSETTE AND HOUSING THEREFORE

Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

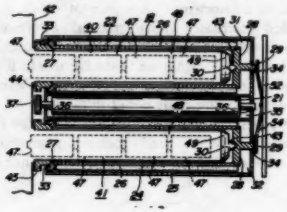
Filed Nov. 7, 1985, Ser. No. 795,860
Claims priority, application Japan, Nov. 8, 1984, 59-235646; Nov. 14, 1984, 59-240210; Nov. 14, 1984, 59-240220
Int. Cl.[4] B41J *35/28*
U.S. Cl. 400—208 12 Claims

1. A cassette for fitting into a housing of an image building apparatus having a recording head that builds an image on a printing medium, the cassette comprising:

an ink donor medium for transferring ink on said ink donor medium onto the printing medium;

a pair of cores with said ink donor medium spanned therebetween; and

a platen roller disposed between the pair of cores, a part of the peripheral surface of the platen roller coming in pressure contact with a recording surface of the recording

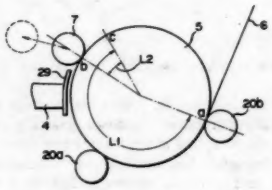


head via said ink donor medium and said printing medium when the cassette means is fitted into the housing of the image building apparatus.

4,702,632
SHEET LOADING DEVICE AND METHOD FOR A PRINTING APPARATUS

Mitsuhiro Taketani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed Aug. 14, 1985, Ser. No. 765,500
Claims priority, application Japan, Aug. 31, 1984, 59-181839; Aug. 31, 1984, 59-181857
Int. Cl.[4] B41J *13/20*
U.S. Cl. 400—639.1 7 Claims



1. A sheet loading device for a printing appartus having a platen roller and a paper bail roller manually movable in and out of contact with the platen roller, the device comprising:

means for positioning the leading end of a sheet at a predetermined position on the platen roller;

means for detecting whether the paper bail roller is in or out of contact with the platen roller; and

paper loading means responsive to said detecting means for rotating the platen roller in a normal direction through a first predetermined angle when said detecting means detects that the paper bail roller is manually moved out of contact with the platen roller, and then rotating the platen roller in a reverse direction opposite the normal direction through a second predetermined angle.

4,702,633
MULTICOLOR WRITING IMPLEMENT

Günther Schmidt, Baden-Baden, Fed. Rep. of Germany, assignor to The Parker Pen Company, Janesville, Wis.

Filed Sep. 23, 1980, Ser. No. 190,024
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1979, 2938716
Int. Cl.[4] B43K *27/12*
U.S. Cl. 401—34 4 Claims

1. A writing implement, comprising in combination

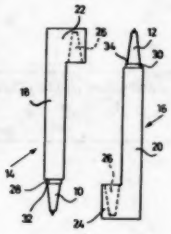
first and second grip members each having an elongated gripping portion and a laterally extending shroud portion at one end of said gripping portion,

first and second shoulders respectively provided on said laterally extending shroud portions, said shoulders facing toward the other end of the associated gripping portion,

a first stylus extending from said other end of said gripping portion of said first grip member,

a second stylus extending from said other end of said second grip member,

a first stylus receiving recess in said laterally extending



portion of said first grip member for removably receiving said second stylus, and

a second stylus receiving recess in said laterally extending portion of said second grip member for removably receiving said first stylus when said second stylus is received in said first stylus receiving recess,

whereby said first and second grip members may be interconnected with the respective styli extending into the recesses in the other one of said grip members.

4,702,634

CONTINUOUS FEED MECHANICAL PENCIL WITH PUSH BUTTON LEAD FEED ACTUATOR

Gerald C. Herold, Janesville, and Harley A. Jung, Fort Atkinson, both of Wis., assignors to Parker Pen (Benelux) B.V., Breda, Netherlands

Filed May 17, 1982, Ser. No. 379,104

Int. Cl.⁴ B43K *21/02*

U.S. Cl. 401—53 **13 Claims**

1. A mechanical pencil, comprising

a generally tubular housing having open front and rear ends,

a lead reservoir and lead advance mechanism mounted within said housing,

said lead advance mechanism being responsive to a forward axial thrust applied thereto to advance lead contained in said reservoir through the front end of said pencil,

actuator means slidingly mounted in said housing rearwardly of said lead advance mechanism for transmitting an axial force applied to said actuator means to said lead advance mechanism as said actuator means is moved from its rearwardmost position to its forwardmost position,

said actuator means including an actuator button protruding from said rear end of said housing when said actuator means is in said rearwardmost position, and

said actuator means having a forward stroke between said rearwardmost and forwardmost positions which is no shorter in length than the maximum distance said actuator button protrudes from said rear end of said housing when said actuator means is in said rearwardmost position,

whereby said actuator button is shrouded by said housing when said actuator means is in its forwardmost position.

4,702,635

CLAMP APPARATUS FOR CONNECTING MEMBERS HAVING CYLINDRICAL SURFACES

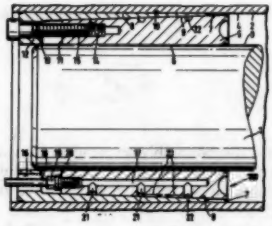
Ralph Muellenberg, IM Wiesengrund 6, D-4048 Grevenbroich 12, Fed. Rep. of Germany

Continuation of Ser. No. 581,031, Feb. 17, 1984, abandoned. This application Aug. 7, 1986, Ser. No. 894,091

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1983, 3305538

Int. Cl.⁴ F16D *1/06*

U.S. Cl. 403—15 **7 Claims**



1. A replaceable clamp unit for exerting clamping forces between an inner structural element having a cylindrical outer circumferential surface and an outer structural element having a cylindrical inner circumferential surface, said unit comprising:

a first conical ring having a cylindrical outer surface adapted to rest against an inner circumferential surface of an outer structural element, said first conical ring having a sloping conical inner surface;

a second conical ring cooperating with said first ring, said second conical ring having a cylindrical inner surface adapted to rest against an outer circumferential surface of an inner structural element, and a sloping conical outer surface complementary to said sloping conical inner surface;

axial threaded means for drawing at least one of said conical rings axially relative to each other such that said sloping conical surfaces ride along each other, whereby upon threading of said axial threaded means said conical rings may be brought from an untensioned condition to a tensioned condition wherein said rings exert radial clamping forces upon said inner and outer structural elements; and

means for increasing said radial clamping forces comprising a plurality of surface channels formed on at least one of said surfaces and means for communicating said surface channels with a source of a flowable lubricant under a high pressure for reducing friction when said conical rings are drawn axially relative to each other during tensioning;

said communicating means including an inlet axially directed into at least one of said conical rings, said axial tensioning means operative with said conical rings so that said axial tensioning means and conical surfaces maintain all of said conical rings proximate to one another in both said ten-

sioned and untensioned conditions, so that said clamp unit may be inserted and removed from between the inner and outer structural elements as a unit in an untensioned condition.

4,702,636

SYSTEM FOR CONNECTING TWO MEMBERS TOGETHER

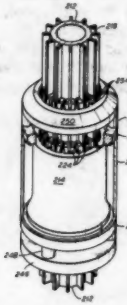
Peter J. D. Guile, Reading, United Kingdom, assignor to Exxon Production Research Company, Houston, Tex.

Continuation-in-part of Ser. No. 686,172, Dec. 24, 1984, abandoned. This application Feb. 12, 1986, Ser. No. 829,458

Claims priority, application United Kingdom, Jan. 6, 1984, 8400332

Int. Cl.[4] E02B *17/00*

U.S. Cl. 403—24 **12 Claims**



1. An apparatus adjustably securing an elongate member to the main body of an offshore structure, said elongate member extending between said main body and the ocean bottom, comprising:

a support member connected to said main body, said support member defining an axial recess adapted to receive said elongate member;

a plurality of radial fins extending inwardly into said axial recess from said support member, said radial fins defining an annularly arranged series of axially extending channels;

a plurality of radial fins extending outwardly from said elongate member, said elongate member and said support member being so sized and their respective fins so arranged that said elongate member can be positioned within said support member with the fins of said elongate member each extending into the channel between two adjacent fins of said support member to define a series of axially extending recesses laterally bounded on one side by an elongate member fin and on the other side by a support member fin; and

at least one wedge positioned in each of said axially extending recesses.

4,702,637

CONICAL STRESSING DEVICE FOR CONNECTING A HUB TO A SHAFT

Ralph Muellenberg, Im Wiesengrund 6, D-4048 Grevenbroich 12, Fed. Rep. of Germany

Filed May 23, 1986, Ser. No. 866,588

Claims priority, application Fed. Rep. of Germany, May 25, 1985, 3518954

Int. Cl.[4] F16D *1/06*

U.S. Cl. 403—373 **8 Claims**

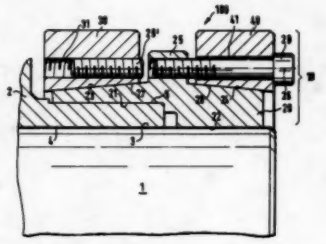
1. A double conical stressing device for connecting a hub to a shaft, comprising:

(a) a double conical ring adapted to be mounted about an outer periphery of a hub, said double conical ring having a pair of peripheral surfaces axially spaced apart and tapered in opposite directions;

(b) said double conical ring having a wall thickness varying along the tapered surfaces, the greatest wall thickness being between said tapered surfaces;

(c) a pair of conical rings, each having a conical peripheral surface on a respective conical surface of said double conical ring;

(d) a plurality of axial bolt means for axially tensioning said



rings and placing said conical rings under axial tension for sliding along said conical surfaces;

(e) one of said conical rings adapted to tension a first portion of the device on the hub and the other conical ring adapted to tension a second portion of the device on a shaft portion adjacent the hub;

said rings having inner surfaces of different internal diameters whereby one conical ring is adapted to be mounted on the hub and the other conical ring is adapted to be mounted on the shaft portion.

4,702,638

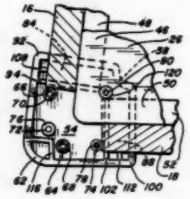
INEXPENSIVE, KNOCK-DOWN FURNITURE ASSEMBLED WITH MATING, MOLDED, PLASTIC SHELLS FOR CORNERS AND ELBOWS

Jon Zalesak, Hortonville, Wis., assignor to American Toy & Furniture Co., Inc., Chicago, Ill.

Filed Nov. 10, 1986, Ser. No. 928,858

Int. Cl.[4] B25G *3/36*

U.S. Cl. 403—403 **6 Claims**



1. A furniture piece for children wherein the furniture piece includes panels of inexpensive sheet material and rail means operatively associated with said panels; the furniture piece including, in combination:

a plurality of rails each with a longitudinal groove formed therein adapted for receiving thereinto an edge of one of said sheet material panels;

corner connecter shell pairs each formed in a shell-like configuration for defining, when assembled, a pair of transverse sockets, each adapted to receive therein one rail end for holding therein an end of a rail;

the shell-like configuration of each corner connector including a first molded shell with elongated pins and tubes extending transversely of the shell toward the cooperating shell, the other shell of the connector shell pairs also

having elongated pins and tubes of a size and shape and position to receive, in cooperating manner, the pins and tubes of the first molded shell in a manner to hold the corner connector shell pairs frictionally assembled when pressed together; and

the shell-like configuration of the corner shell pairs also including at least one stud on one shell adapted to extend toward the other shell and into an opening provided in the panel, so as to hold and position the panel relative to the corner shell pairs and to the plurality of rails.

4,702,639

SLALOM POST

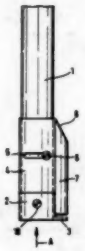
Hans Hinterholzer, Niels Juelsgt 36c, 0272 Olso 2, Norway

Filed Aug. 30, 1985, Ser. No. 771,437

Claims priority, application Austria, Mar. 9, 1984, 2809/84

Int. Cl.[4] E01F *9/01*; A63C *19/10*

U.S. Cl. 404—10 **12 Claims**



1. A slalom post having a bottom end, said slalom post comprising:

a. at least one anchoring element connected to said slalom post in the area of said bottom end, each said anchoring element comprising a laterally projecting substantially horizontally flat flange extending perpendicular to the vertical axis of said post and torsionally stably secured to and extending outwardly beyond the cross-sectional profile of said post; and

b. at least one protection wedge rotatably attached to said post adjacent said flange for rotation about the axis of said post, holding means preventing said protection wedge from moving along said axis of said post, the direction of the longest dimension of said wedge being parallel to the axis of said post with the protection wedge having a cross-sectional profile perpendicular to said post axis, said profile being approximately the same shape and size as said projecting flange, the wedge and flange being aligned with the post is forced into the snow such that said wedge protects said flange from bending, and then on rotation of said post about its axis once said post has been forced into the snow the relative rotation of said flange and wedge exposes said flange so that it acts to prevent the slalom post being pulled from the snow.

4,702,640

ROTATING TUBE CONCRETE FINISHER

J. Dewayne Allen, Paragould, Ark., assignor to Allen Engineering Corporation, Euless, Tex.

Filed Jul. 23, 1986, Ser. No. 889,190

Int. Cl.[4] E01C *19/23, 19/24*

U.S. Cl. 404—75 **16 Claims**

1. A method for finishing an uphill to downhill sloping surface of an area of plastic concrete having upper and lower edges defining the length of said area and first and second load bearing side surfaces defining the width of said area, said method comprising:

a. positioning an elongated cylindrical finishing roller having first and second ends, a longitudinal axis and a length exceeding the width of said area across the lower edge of said area with the first and second ends of said roller being supported by said first and second load bearing side surfaces of said area and the lower surface of said roller contacting the plastic concrete surface;

b. gripping the first end of said roller with first rotary drive means and rotating said roller in a downhill climbing direction;

c. providing a winch system spaced apart from said roller and including

i. a first winch drum having a first winch cable coupled to first bearing means;

ii. a second winch drum having a second winch cable coupled to second bearing means;

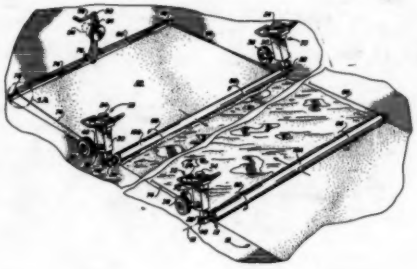
iii. a winch stand for anchoring said winch system in proximity to the first edge of said area and for maintaining said first and second winch drums elevated above the surface of the plastic concrete;

d. securing said winch system to a stationary object in proximity to the upper edge of said area;

e. providing first and second bearing means for rotatably coupling the first and second winch cables to the first and second ends of said roller;

f. operating said winch system to move said roller from the lower edge of said area uphill along the length of said area to the upper edge of said area;

g. gripping the second end of said roller with second rotary



drive means and rotating said roller in an uphill climbing direction; and

h. operating said winch system to move said roller from the upper edge of said area downhill along the length of said area to the lower edge of said area.

5. Apparatus for finishing the surface of an area of plastic concrete placed within first and second spaced apart load bearing side surface defining the width of said area, comprising:

a. an elongated cylindrical finishing roller supported by the first and second load bearing side surfaces of said area and having first and second ends, a longitudinal axis and a length exceeding the width of said area, the lower surface of said roller contacting the surface of said plastic concrete;

b. an end handle having a length, upper and lower ends, and a lengthwise axis;

c. first rotatable coupling means for rotatably coupling said end handle to the first end of said roller and for maintaining the lengthwise axis of said end handle oriented perpendicular to the longitudinal axis of said roller;

d. first rotary drive means coupled to said end handle and to said roller for rotating said roller in a first direction to cause the rotating lower cylindrical surface of said roller to smooth and finish the plastic concrete surface;

e. end handle support means coupled along the length of said end handle at a location spaced apart from the lower end

of said handle and engaging the first load bearing side surface of said area for providing low friction engagement with the first load bearing side surface, for maintaining the lengthwise axis of said handle inclined at a fixed angle with respect to a vertically oriented axis extending through the first end of said roller, and for transferring a portion of the weight of said end handle/rotary drive means unit to the first load bearing side surface of said area; and

f. traction means spaced apart from said roller, attached to a stationary object and including first and second cables coupled to said roller for exerting a traction force on the first and second ends of said roller to move said roller along the length of plastic concrete, said traction means including a winch system with

i. a first winch drum having a first winch cable for exerting the traction force on the first end of said roller;

ii. a second winch drum having a second winch cable for exerting the traction force on the second end of said roller; and

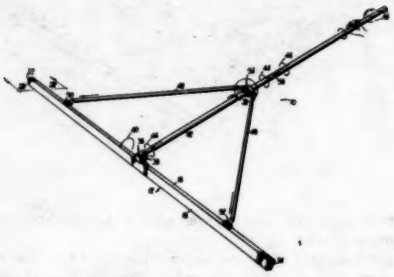
iii. a winch stand for anchoring said winch system in proximity to the first end of said area and for maintaining said first and second winch drums elevated above the surface of the plastic concrete.

4,702,641

MULTI-PURPOSE CONCRETE WORKING TOOL

Charles F. Naser, Atlanta, and Steven L. Aldridge, Alpharetta, both of Ga., assignors to Atlanta Concrete Accessories Inc., Mableton, Ga.

Filed May 1, 1986, Ser. No. 858,317
Int. Cl.[4] E01C *19/44*
U.S. Cl. 404—97 **6 Claims**



1. A multi-purpose concrete working tool for working a planar concrete surface comprising:

(a) an elongated, straight blade member having

i. a length;

ii. a midpoint;

iii. a bottom working surface capable of being oriented at an angular pitch with respect to the concrete surface;

iv. front surface; and

v. a rear surface; wherein the bottom working surface exerts a pressure of at least 0.075 psi when the working surface is flat on the concrete surface and the bottom working surface joins the front and rear surfaces respectively to form a sharp front edge and a sharp rear edge;

(b) an elongated handle having a length, a first end, and a second end;

(c) lateral brace means having a first end connected at a point along the length of the handle and a second end pivotally connected to the blade member at a point displaced from the midpoint of the blade member; and

(d) pitch adjustment means comprising:

i. lower bracket means secured to the blade member adjacent the midpoint; and

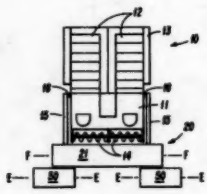
ii. top bracket means pivotally connected to the lower bracket means and including drive means operably interconnecting the lower bracket means and top bracket means for pivoting the lower bracket means with respect to the top bracket means, wherein the first end of the handle is connected to the drive means so that the pitch of the blade member can be remotely and continuously varied over a range of angles while the second end of the handle remains at a fixed elevation above the concrete surface.

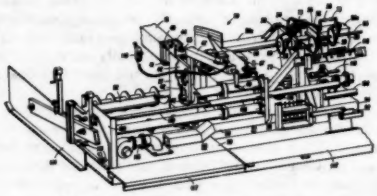
4,702,642

EXTENSIBLE SCREED ASSEMBLY FOR A BITUMINOUS PAVER

Joseph E. Musil, Ely, Iowa, assignor to Cedarapids, Inc., Cedar Rapids, Iowa

Filed Jul. 25, 1986, Ser. No. 889,234
Int. Cl.[4] E01C *19/22*
U.S. Cl. 404—118 **12 Claims**





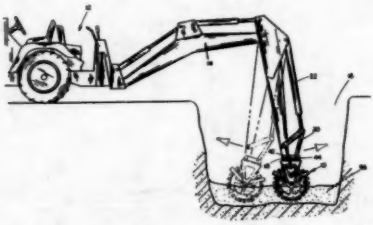
1. In an extensible screed assembly for use with a bituminous paving machine having a tractor unit with a pair of screed pull arms pivoted at their forward ends to the sides of the tractor unit and extending rearwardly therefrom, the screed assembly being attachable transversely across the rear ends of the screed pull arms and having first inclination adjusting means for pivoting the entire screed assembly relative to the screed pull arms about a screed assembly inclination axis transversely of the screed pull arms effective to adjust the fore-and-aft inclination of the entire screed assembly relative to a roadway, the screed assembly including a main screed and a pair of screed extensions offset rearwardly of the main screed, each of the screed extensions being longitudinally moveable in opposite directions relative to the main screed effective to adjust the overall width of the screed assembly, the main screed and screed extensions having underlying planar screeding surfaces, the improvement comprising: second inclination adjusting means pivoting each of the screed extensions relative to the main screed about screed extension inclination axes transversely of the screed pull arms effective to selectively adjust on the run the fore-and-aft inclination of each of said screed extension surfaces relative to the fore-and-aft inclination of said main screed surface.

4,702,643

COMPACTION WHEEL

James C. Thilmony, 607 11th St., Mandan, N. Dak. 58554

Filed Feb. 6, 1986, Ser. No. 826,610
Int. Cl.[4] E01C *19/26*
U.S. Cl. 404—121 5 Claims



1. A compaction wheel for use with a backhoe or the like having a boom arm pivotally mounted thereon, comprising,

a generally U-shaped support frame means adapted to be pivotally connected to the boom arm,

a horizontally disposed axle means mounted on said supporting frame means and having opposite ends,

a plurality of vertically disposed and horizontally spaced rotatable wheel disc members mounted on said axle means, each disc having a plurality of openings therein,

a plurality of compaction members mounted alternately and on opposite sides of each of said wheel members and protruding outwardly from the peripheries thereof,

said compaction members on each said wheel member being circumferentially offset with respect to the compaction members on the other wheel members, the periphery of said wheel between said discs being open and unobstructed from said compaction members to said axle means,

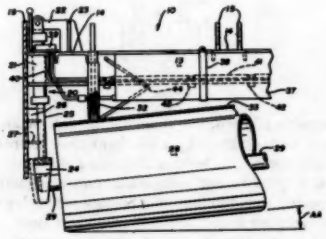
and a U-shaped blade means having each leg of the U-shape mounted to said support frame, said blade means extending outwardly from and substantially perpendicularly to said axle means, with the base portion of said U-shape parallel to said axle and proximal to the periphery of said compaction members.

4,702,644

TRUCK MOUNTED ROLLER

Dominic A. Cioffi, 4107 Middletown Rd., Canfield, Ohio 44406

Filed May 16, 1986, Ser. No. 863,950
Int. Cl.[4] E01C *19/26*
U.S. Cl. 404—128 2 Claims



1. An improvement in a detachable truck mounted roller, the truck mounted roller comprising a main support frame with support arms extending therefrom for mounting on a truck, end plates on the free ends of the support frames, pairs of roller support assemblies secured inwardly of either end of the main support frame, and an encasement cleaner frame and mat assembly engaging the roller of the assembly, the roller having a roller shaft extending longitudinally through the roller and having end faces that are oriented transversely of the longitudinal axis of the roller shaft, the improvement in combination therewith comprising:

the end frame plates being spaced apart from each other a distance greater than the axial length of the roller shaft so that the roller shaft and the roller can move along the longitudinal axis of the roller shaft between the end frame plates;

the roller support assemblies each including a vertically oriented hydraulic piston/cylinder assembly having the cylinder thereof spaced from an adjacent end frame plate and pivotably attached to the support frame to be pivotably movable toward and away from that adjacent end frame plate, said piston/cylinder assembly further including a piston rod extending downwardly from said cylinder and movable therewith toward and away from the adjacent end frame plate and a bearing support block fixedly mounted on the end of said piston rod remote from said cylinder for movement therewith toward and away from the adjacent end frame plate, guide means mounted on the end frame plate to slidably engage said bearing support block for guiding said bearing support block in vertically directed movement and in movement toward and away from the adjacent end frame plate, said guide means including a pair of guide rails mounted on the adjacent end frame plate to be located adjacent to said bearing support block and which extend outwardly from the adjacent end frame plate a distance sufficient to remain in bearing support block guiding position with respect to said bearing support block when said bearing support block moves away from the adjacent end frame plate, thrust accommodating means in said bearing block which receives one end of the roller shaft and which abuts the roller shaft end face associated with that end of the roller shaft so that movement of the roller shaft along the longitudinal axis thereof toward the adjacent end frame plate causes said bearing support block to move toward the adjacent end frame plate so that movement of the roller in a direction along the longitudinal axis of the roller shaft and movement of the roller in a vertical direction are both permitted whereby the roller can move to compensate for compaction surfaces that are uneven in both the vertical and the transverse directions; and

means for transversely stabilizing the encasement cleaner frame.

4,702,645

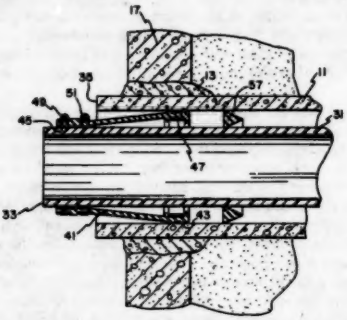
SLIPLINE ADJUSTABLE MANHOLE SEAL

Harry W. Skinner; James W. Skinner, both of Fort Wayne, Ind.; William P. O'Donnell, Wilmington, Del., and William O. Skinner, Baraboo, Wis., assignors to Press-Seal Gasket Corporation, Fort Wayne, Ind.

Division of Ser. No. 644,387, Aug. 27, 1984, Pat. No. 4,619,555.
This application May 8, 1986, Ser. No. 860,797
Int. Cl.[4] F16J *15/52*
U.S. Cl. 405—154 3 Claims

1. An arrangement for providing substantially liquidtight seals between a pair of nested generally coaxial elongated pipes near the respective pipe ends while allowing limited relative axial motion of the pipes as might occur due to temperature changes and dissimilar coefficients of thermal expansion for the pipes comprising: an outer pipe; an inner pipe axially extending in said inner pipe; said inner and outer pipes having dissimilar coefficients of thermal expansion; a pair of pliable sleeve-like gaskets having an outer circumference near one end approximately the same as the inner circumference of the outer pipe and an inner circumference near the opposite end approximately the same as the outer circumference of the inner pipe; each said gasket being situated in axially spaced locations on said inner and outer pipes to define an annular chamber between the outer pipe inner surface and the inner pipe outer surface; an expandable ring for forcing the sleeve one end

radially outwardly into sealing engagement with the outer pipe inner surface; and a contractable ring for constricting the sleeve other end radially inwardly into sealing engagement



with the inner pipe outer surface, said gasket sealing said annular space and permitting said inner pipe to convey fluids past any break in said outer pipe.

4,702,646

PIPE INITIATION ANCHOR

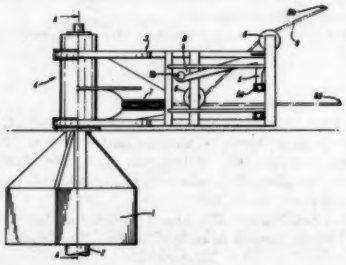
Gordon A. Morris, Edinburgh, Scotland, assignor to Santa Fe International Corporation, Alhambra, Calif.

Filed Mar. 5, 1986, Ser. No. 836,319

Claims priority, application United Kingdom, Mar. 12, 1985, 8506296

Int. Cl.[4] F16L *1/04*

U.S. Cl. 405—169 **5 Claims**



1. In a pipe initiation anchor for forming a fixed anchor point for use in laying underwater pipelines, the combination of:

a frame;

a ground engaging member;

means for attaching said frame to said ground engaging member; and

socket means carried in said frame defining a socket for receiving and retaining the end portion of the pipeline within said socket,

said socket means including first and second generally horizontal bars, with said first bar mounted in said frame and with said second bar mounted on a pivoting member in said frame and spaced from said first bar, and

a counter-balance weight carried on said pivoting member urging said second bar toward said first bar.

4,702,647

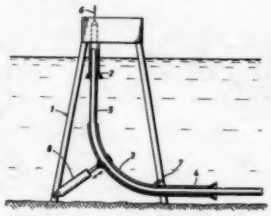
REDUCED J-TUBE PULL FORCE

Joe O. Esparza, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 8, 1986, Ser. No. 904,427

Int. Cl.[4] F16L *1/00*; B63B *35/04*

U.S. Cl. 405—169 **12 Claims**



1. A method for reducing the force required to move a pipe through a J-tube attached to an offshore platform, comprising:

constructing the J-tube of at least two completely spaced-apart sections;

moving the pipe through the J-tube sections; and

oscillating at least one member of the pipe and the J-tube sections as the pipe is moved through the J-tube sections, thereby reducing friction between the pipe and at least one of the J-tube sections.

4,702,648

TENSION LEG PLATFORM

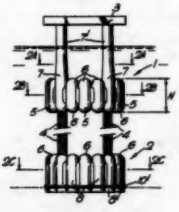
Jan Stageboe, Bygdoy alle 66, N-0265 Oslo 2, and Erik Gjeruldsen, Havnegaten 5, N-3155 Asgardstrand, both of Norway

Filed Apr. 26, 1985, Ser. No. 727,564

Claims priority, application Norway, Apr. 27, 1984, 841671

Int. Cl.[4] B63B *35/44*; E02B *17/00*

U.S. Cl. 405—224 **9 Claims**

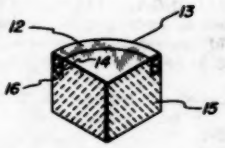


1. A tension leg platform structure for petroleum recovery on the sea bed, comprising a platform deck supported by a buoyancy structure, a bottom anchoring structure which is anchored by gravity, and tension elements extending between said buoyancy structure and said bottom anchoring structure, said buoyancy structure comprising hollow deck-supporting shafts, wherein said anchoring structure comprises an annular array of closely adjacent, substantially cylindrical, upright, closed concrete cells, a number of which corresponding to the number of shafts being vertically aligned with a respective one of said shafts and forming anchors for said tension elements, each of said tension elements extending vertically between one of said cells and the respective aligned shaft of said buoyancy structure.

4,702,649
POLYCRYSTALLINE DIAMOND AND CBN CUTTING TOOLS

Ranga Komanduri, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 27, 1986, Ser. No. 833,930
Int. Cl.[4] B23B *27/20*
U.S. Cl. 407—119 **39 Claims**

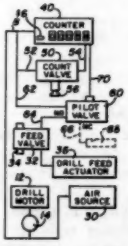


1. A process for producing a composite of an annular polycrystalline diamond layer integrally adhered in an annular recess in an upper peripheral portion of a cemented carbide substrate structure wherein said diamond layer is directly bonded to said substrate structure at least partly by forming an interface therewith which consists essentially of forming a substrate structure consisting essentially of a substantially cylindrical substrate with an annular recess with only one side wall in an upper peripheral portion thereof, said cemented carbide consisting essentially of from about 75% by weight to about 97% by weight of polycrystalline metal carbide and from about 3% by weight to about 25% by weight of a metallic cementing agent, filling said recess with crystals of diamond, heating the resulting assembly under an applied pressure to a temperature above the melting point of said metallic cementing agent but below a temperature which has any significant deleterious effect on said assembly for a period of time sufficient to bond said crystals together and form said composite and recovering said composite, the thickness of said polycrystalline diamond layer being substantially equivalent to the depth of said recess.

4,702,650
POSITIVE FEED DRILL USE COUNTER

Robert F. Golwas, San Demas, Calif.; Robert A. Pennison, Bellville, and Richard E. Eckman, Houston, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 8, 1985, Ser. No. 763,846
Int. Cl.[4] B23B *49/00*
U.S. Cl. 408—6 **5 Claims**



1. In a pneumatic drill assembly having an air powered motor and an automatic drill feed and retraction mechanism, an improvement comprising a means for limiting the number of times the drill assembly is used to bore holes with a particular cutter, including:

means associated with the automatic feed and retraction mechanism for sensing the completion of a drilling operation;

means associated with said sensing means for counting the number of drilling operations, said counting means comprising a digital counter receiving an input signal from said sensing means, a counter mechanism operable to count down from a predetermined number to zero, and a means for transmitting an output signal upon a zero count;

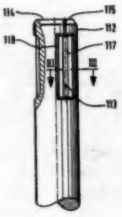
an air pulse valve comprising a valve member for receiving inputs from said sensing means and providing output air pulses to said counting means, said counter mechanism counting down one count for each air pulse received from said air pulse valve; and

a reset control valve having a normally open pneumatic valve operably connected to said counter means for receiving said output signal to close said normally open pneumatic valve, thereby preventing further normal operation of said automatic drill feed and retraction mechanism.

4,702,651
TOOL HOLDER FOR DRILLING MACHINES, DRILLING DEVICE AS WELL AS DRILLS AND SET OF DRILLS

Werner Kleine, Achim-Uesen, Fed. Rep. of Germany, assignor to Gebruder Heller GmbH, Werkzeugfabrik, Achim Uphusen, Fed. Rep. of Germany

Filed Apr. 28, 1986, Ser. No. 856,181
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515555
Int. Cl.[4] B23B *31/04, 51/02*
U.S. Cl. 408—226 **24 Claims**



7. A drilling device comprising a tool holder with a jaw holder having a hollow space to receive a chucking shank to be chucked, and a drill bit having a chucking shank receivable in the hollow space, wherein plural jaws are radially adjustable and lockable in the jaw holder for selective releasable engagement with the chucking shank, characterized in that the hollow space is cylindrical and the chucking shank has a cylindrical circumferential surface so conforming to the geometric cylinder of said hollow space that the hollow space forms an axial guide for the chucking shank, that each of the jaws has a radially inwardly extending longitudinal drill-bit engageable rib formation, and that the chucking shank is characterized by chucking grooves configured for angularly locating axially inserted reception of the chucking shank.

4,702,652
ADVANCED MEMORY TYPE PROFILING CONTROL METHOD FOR A MACHINE TOOL

Tadashi Rokkaku; Akira Houzouji; Shunji Omori, and Takayuki Toto, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,626
Int. Cl.[4] B23Q *35/14;* G05B *19/33*
U.S. Cl. 409—84 **4 Claims**

1. A profiling control method of an advanced memory type for a machine tool including:

a tracer provided with a stylus at an end thereof which is moved along a surface of a model for detecting a shape of the model, said stylus performing a spheric motion around

a ball seat fixed in the tracer, and the tracer comprises means for detecting components e_x, e_y and e_z in a three-orthogonal-axis system of positional variation of the stylus to the ball seat of the tracer;

a control unit for producing control signals for the tracer by utilizing an output signal of the tracer;

a tracer drive unit for moving the tracer on the basis of the control signals for the tracer;

a machine body for controlling a cutting tool on the basis of the control signals for the tracer;

said method comprising the steps of:

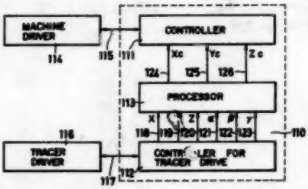
calculating coordinates of the stylus from the coordinates (X, Y, Z) of the ball seat and the positional variations (e_x, e_y, e_z) on the basis of the following equations:

$$Xp=X+e_x$$

$$Yp=Y+e_y$$

$$Zp=Z+e_y-l$$

where l is a distance between the ball seat and the stylus when $e_z=0$, said coordinates being used as the control signals for the tracer;



calculating control signals for the machine body by calculating respective numbers (Cxn, Cyn, Czn) of distribution pulses, corresponding to movement of an end mill of the machine body, from coordinates (Xpn+1, Ypn+1, Zpn+1) and (Xpn, Ypn, Zpn) at sampling times n+1 and n on the basis of the following equations:

$$Cxn=(Xpn+1-Xpn)/\Delta h$$

$$Cyn=(Ypn+1-Ypn)/\Delta h$$

$$Czn=(Zpn+1-Zpn)/\Delta h$$

wherein Δh is a unit of minimum movement of the end mill, and when Cxn<0, Cyn<0 Czn<0, movements of the end mill in a negative direction are represented, respectively;

storing the control signals for the machine body in a memory; and

driving the end mill on the basis of the control signals for the machine body stored in the memory, characterized in that said step of calculating the control signals comprises a step of calculating average velocity vectors (Vpxn, Vpyn, Vpzn) of the stylus from coordinates (Xpn+m, Ypn+m, Zpn+m) and (Xp, Yp, Zp) of the stylus at sampling times n+m and n on the basis of the following equations:

$$V_{pxn}=\frac{X_{pn+m}-X_{pn}}{m\cdot\Delta ts}$$

$$V_{pyn}=\frac{Y_{pn+m}-Y_{pn}}{m\cdot\Delta ts}$$

-continued

$$V_{pzn}=\frac{Z_{pn+m}-Z_{pn}}{m\cdot\Delta ts}$$

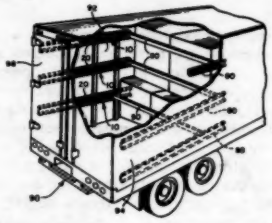
where Δts is a time interval for sampling.

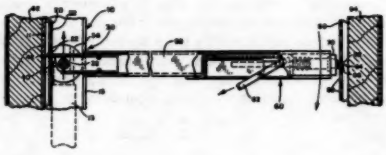
4,702,653

CAPTIVE CROSS MEMBER SYSTEM FOR RESTRAINING MOVEMENT OF LADING

William R. Gaulding, Littleton, Colo.; William D. Smith, and Nicholas C. Marsh, both of Topeka, Kans., assignors to The Atchison, Topeka and Santa Fe Railway Company, Chicago, Ill.

Filed Mar. 7, 1985, Ser. No. 709,055
Int. Cl.[4] B61D *45/00*
U.S. Cl. 410—144 13 Claims





1. A captive cross-member system for preventing lading movement in a freight transport vehicle of the type having first and second walls defining a loading region therebetween, said system compising:

a crossbar of length substantially equal to the width of said loading region;

a guide channel mounted to one of said walls;

a first latch assembly mounted on a first end of said crossbar and comprising a first latch member extending parallel to the longitudinal axis of said crossbar;

a pivot assembly mounted to said crossbar at said first end; said pivot assembly guiding rotational movement of said crossbar in said guide channel about an axis defined by said pivot assembly;

said guide channel comprising means for capturing and guiding said pivot assembly along the longitudinal axis of said guide channel in a predetermined relation to the guide channel;

a first latch receiving rail mounted parallel to said guide channel and defining a plurality of first latch receiving apertures shaped to accommodate said first latch member; said first latch receiving rail and said guide channel operable to engage said first latch member with an aligned one of said first latch receiving apertures upon rotation of said crossbar to a locked position extending substantially outwardly from said guide channel; said first latch member cooperating during engagement with said aligned one of said first latch receiving apertures to prevent translational movement of said crossbar along said guide channel; said first latch receiving rail and said guide channel further operable to disengage said first latch member from said

aligned one of said first latch receiving apertures upon rotation of said crossbar to a released position substantially aligned with said guide channel;

a second latch assembly mounted to a second end of said crossbar, opposite said first end; said second latch assembly comprising a retractable second latch member and a latch release mechanism operative to retract said second latch member;

a second latch receiving rail mounted to the other of said vehicle walls opposite said first latch receiving rail; said second latch receiving rail defining a plurality of second latch receiving apertures shaped to accommodate said second latch member when said crossbar is in the substantially locked position and to substantially prevent any motion of said crossbar with respect to said vehicle walls; and

a locking element located on at least one of said crossbar and said guide to engage the other of said crossbar and said guide so as to secure said crossbar in a position substantially aligned with and at least partially received within said guide channel.

4,702,654

SPREADING ANCHOR

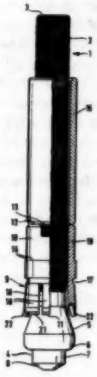
Albert Frischmann, Kenzingen; Johannes Rieger, Emmendingen; Kurt Mermi, Teningen; Herbert Kistner, Freiburg, and E. Harald Zimmermann, Emmendingen, all of Fed. Rep. of Germany, assignors to Upat GmbH & Co., Emmendingen, Fed. Rep. of Germany

Filed Sep. 22, 1986, Ser. No. 910,408

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535262

Int. Cl.[4] F16B *13/04, 13/06*

U.S. Cl. 411—31 **9 Claims**



1. A spreading anchor comprising an anchor rod **(1)** including on the front insertion end thereof a cone **(5)** which flares radially outwardly in the direction of insertion and on which a spreading sleeve **(9)** is operatively movably disposed, said spreading sleeve **(9)** including a plurality of longitudinal slots **(10)** which originate at the front face of the spreading sleeve and form a plurality of spreading lamellae **(18)**, at least two of said spreading lamellae **(18)** being opposed and having cutting inserts **(22)** secured on their end faces **(21)** which point in the direction of insertion of said anchor, the wall thickness of said spreading lamellae **(18)** increasing in the direction of the lamellae end faces **(21)**.

4,702,655

FASTENING SYSTEM INCLUDING AN IMPROVED INTERFERENCE FIT BLIND FASTENER AND METHOD OF MANUFACTURE

James W. Kendall, Huntington Beach, Calif., assignor to Huck Manufacturing Company, Irvine, Calif.

Filed Aug. 27, 1985, Ser. No. 770,160

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—43 **18 Claims**

1. A fastener system including a blind fastener adapted to be received in aligned bores in workpieces to be secured together and, after installation, to provide a preselected interference of desired magnitude with the aligned bores, the fastener system comprising:

a pin having an enlarged pin head and an elongated pin shank,

a tubular sleeve having an enlarged sleeve head and an elongated sleeve shank and adapted to be located on said elongated pin shank whereby the fastener can be installed by the application of a relative axial force between said pin and said sleeve,

said elongated pin shank comprising a generally straight expansion portion adjacent said pin head, a generally straight sizing portion separated from said expansion portion by a breakneck groove, and a pull portion adapted to be gripped by an installation tool for setting the fastener by the application of said relative axial force, said pull portion having a maximum diameter (Dp) which is less than the sizing diameter (Ds) of said sizing portion, said expansion portion having an expansion diameter (De) which is greater than said sizing diameter (Ds) of said sizing portion,

said sleeve having a generally uniform through bore with a relaxed first inside diameter (Di), said sleeve shank having an outer surface with a generally uniform relaxed first outside diameter (Do), said maximum diameter (Dp) of said pull portion being less than said relaxed first outside diameter (Di) of said sleeve shank, said sizing diameter (Ds) of said sizing portion being greater than said relaxed first inside diameter (Di) of said through bore, said sleeve shank having a preselected hole filling portion adapted to be engaged by said expansion portion of said pin to provide said preselected interference of desired magnitude with said aligned bores having a bore diameter (Dw) in the workpieces, said sleeve being pre-assembled on said sizing portion of said pin with a press fit to radially expand and support said sleeve shank substantially along said hole holling portion such that it will be radially expanded to an increased second outside diameter (Do') of said outer surface of said sleeve shank and thereafter said outer surface of said sleeve shank is reduced substantially along said hole filling portion to a known decreased third outside diameter (Do'') of said sleeve shank with the magnitude of said known decreased third outside diameter (Do'') of said sleeve shank being determined by the relative magnitudes of said expansion diameter (De) of said expansion portion and said sizing diameter (Ds) of said sizing portion, said decreased third outside diameter (Do'') of said sleeve shank being less than said increased second outside diameter (Do') of said sleeve shank, said known decreased third outside diameter (Do'') of said sleeve shank being less than said bore diameter (Dw) of said aligned bores whereby said pin and sleeve as preassembled can be received within said aligned bores in a generally clearance relationship, said expansion portion adapted to move into said sleeve shank in response to said

relative axial force and to radially expand said sleeve shank to provide said preselected interference of desired magnitude with said aligned bores along said hole filling portion, the hardness of said pin, sleeve and workpieces being selected to provide said preselected interference of desired magnitude substantially within the elastic limit of said pin, sleeve and workpieces without significant wire drawing of said pin, said pin head operative relative to the end of said sleeve shank opposite from said sleeve head and in response to said relative axial force to form an enlarged blind head engageable with one side of said workpieces, the axial movement of said pin being arrested upon formation of said blind head and said pin fracturing at said breakneck groove in response to said relative axial force attaining a preselected maximum magnitude.

4,702,656

EXPANSION BOLT ASSEMBLY

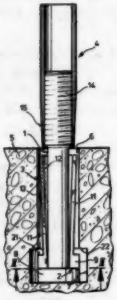
Roger Kerrom, Lörrach, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Furstentum, Liechtenstein

Filed Jul. 14, 1986, Ser. No. 884,996

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1985, 3525245

Int. Cl.[4] F16B *13/06*

U.S. Cl. 411—60 **10 Claims**



1. An expansion bolt assembly for use in boreholes formed in the surface of hard receiving material where the borehole is undercut at a location spaced inwardly from the surface of the hard receiving material, said expansion bolt assembly comprises an axially extending anchor bolt, said anchor bolt having a first end and a second end with the first end arranged to be inserted first into the borehole, said anchor bolt having an axially and circumferentially extending outer surface, a head formed on the first end of said anchor bolt and projecting radially outwardly transversely of the axial direction of said anchor bolt beyond the outer surface of said anchor bolt, a plurality of annular segments spaced angularly apart and located in a ring-shaped arrangement around said anchor bolt adjacent the first end thereof, each said annular segment having a first surface extending radially relative to said anchor bolt axis and facing toward the first end of said anchor bolt and a second surface extending radially relative to said anchor bolt axis and facing toward the second end of said anchor bolt, an axially extending expansion sleeve extending around said anchor bolt and arranged to displace said annular segments radially outwardly into the undercut section in the borehole, said head arranged to contact the first surfaces of said annular segments, wherein the improvement comprises an axially extending support sleeve laterally encircling said anchor bolt and having a first end and a second end with the first end of said support sleeve arranged to be inserted first into the borehole and facing toward the first end of said anchor bolt, said support sleeve has an axially extending inner surface and an axially extending outer surface, said annular segments being secured unitarily to said support sleeve at the first end thereof, and the first and second surfaces of said annular segments projecting radially outwardly from the outer surface of said support sleeve at the first end thereof, said expansion sleeve being axially displaceable toward the first end of said bolt between the outer surface of said bolt and the inner surface of said support sleeve whereby said support sleeve and said annular segments are displaceable radially outwardly.

4,702,657

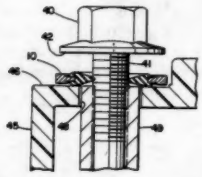
SELF CENTERING SEAL

Jerry G. Jelinek, La Habra, Calif., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Jun. 27, 1986, Ser. No. 879,755

Int. Cl.[4] F16B *43/00*

U.S. Cl. 411—369 **6 Claims**



1. A self-centering, elastomeric seal assembly in combination with a fastener or and the like, comprising

a retainer having generally parallel upper and lower surfaces and a central opening therein, adapted for placement about the shank of the fastener or the like, and

annular elastomeric seal means disposed in said central opening of said retainer and secured thereto for support of said retainer,

said seal means being generally tear drop shaped in cross section comprising a projecting seal portion, adjacent inner and outer recessed seal portions, and an inner circular tip portion, said projecting seal portion extending axially outwardly of said retainer beyond said upper and lower surfaces thereof, said inner and outer recessed seal portions being recessed axially from said upper and lower surfaces of said retainer, said tip portion extending radially inwardly of said inner recessed seal portion and terminating in a smoothly rounded edge of convex curvature, the diameter of said tip portion at said edge being less than the diameter of the shank of the fastener or the like to provide an interference fit thereon for support of the entire seal assembly, the radius of curvature of said edge being less than one-half the dimension between said upper and lower surfaces of said retainer, said inner recessed portion comprising a pair of linearly inwardly converging conical surfaces which merge into said tip portion to position said projecting portion relative to the shank of said fastener or the like and outside a range of tolerance of an opening in which said fastener is to be disposed.

4,702,658

APPARATUS FOR REDUCING INSTALLATION FORCES AND COSTS IN A TAPERED BOLT INSTALLATION

Larry Salter, Rancho Palos Verdes, Calif., assignor to Paul R. Briles, Gardena, Calif.

Division of Ser. No. 525,294, Aug. 22, 1983. This application Sep. 8, 1986, Ser. No. 904,951

Int. Cl.[4] F16B *35/04*

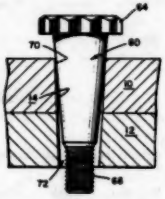
U.S. Cl. 411—426 **2 Claims**

1. A system for reducing the installation forced in a stacked array comprising;

a plurality of different surface materials having a tapered bore,

a tapered bolt located within said bore and in which the

taper formed on the surface of said tapered bolt is different from the taper formed on the surface of said tapered bore, said taper on said tapered bolt extending gradually throughout the length of the bolt surface, and



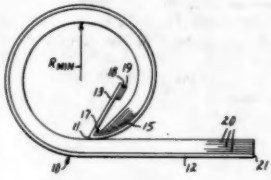
said tapered bolt located within said tapered bore to form an interference whereby different radial stresses are generated at the larger end of the tapered bore than at the smaller end of said tapered bore.

4,702,659

BACKING FOR BINDING SHEETS

Gary R. Hanson, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 19, 1986, Ser. No. 864,528
Int. Cl.[4] B42D *3/00*; B42C *11/00*
U.S. Cl. 412—4 **10 Claims**



9. A method of binding together loose pages of paper of known length, with and thickness comprising the steps of:

selecting a cover having a front portion and a back portion of unequal width divided by a fold line and a length at least equal to the loose page length, said cover having a strip of pressure-sensitive adhesive along the fold line, said strip of adhesive having a width (A_W) determined by the formula:

$$A_W = 2t\pi(N_{max} + 1)\frac{X^\circ}{360^\circ}$$

wherein:

t=the loose page thickness

X°=the minimum degree of wrap of the loose sheets or 180°; and

N_{max}=the maximum number of loose pages to be bound, and said back portions having a width equal to the width of the strip of adhesive plus the known page width,

removing a release liner from the strip of adhesive,

placing the loose pages to be bound in the cover aligning them to the free longitudinal edge of the back cover portion,

jogging the cover and loose pages to be bound against a flat surface along the free longitudinal edge of the back cover portion,

clamping the pages together along said free longitudinal edge,

rolling the opposite edge of the pages and the backing toward said clamped edge, causing the unclamped longitudinal edge to become progressively shingled until the strip of adhesive is completely covered,

pressing the ends of the rolled pages into contact with the strip of adhesive, and

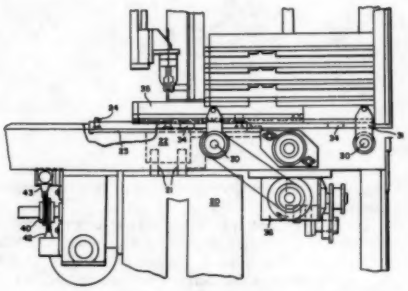
unrolling the cover and pressing the entire shingled edges of the pages into the strip of adhesive.

4,702,660

METHOD AND APPARATUS FOR STORING AND HANDLING TRAYS FOR WORKPIECES

Gerald Niehaus, and Ernest Bivens, both of Evansville, Ind., assignors to Evana Tool & Engineering Inc., Evansville, Ind.

Filed Nov. 12, 1985, Ser. No. 796,770
Int. Cl.[4] B65G *60/00*
U.S. Cl. 414—95 **5 Claims**



5. A method of storing a plurality of trays having support flanges and cutout portions in the support flanges and for delivering a tray to a storage rack from a trackway comprising the steps of providing a storage rack filled with vertically stacked trays with the trays supported above the trackway by rotatable support arms, indexing a first tray on the trackway partially into the storage rack with the cutout portions in the support flanges of said first tray being positioned to permit the support arms to rotate through the cutout portions and with said first tray out of contact with a tray thereabove in the storage rack, rotating the support arms through the cutout portions of said first tray to a position out of engagement with the stacked trays to lower the trays to a position wherein the tray immediately above said first tray is in direct contact with the first tray, indexing the first tray completely into the storage rack while the first tray is in contact with the tray thereabove and rotating the support arms to lift the stacked trays to a position to accept a further tray indexing into the storage rack.

4,702,661

ROBOT CARRIER STRUCTURE

Luciano Bislach, Strada Communale San Vito-Revigliasco 350, 10133 Turin, Italy

Filed Jun. 7, 1985, Ser. No. 742,203
Claims priority, application Italy, Jun. 19, 1984, 67631 A/84
The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.
Int. Cl.[4] B25J *5/00*
U.S. Cl. 414—460 **5 Claims**

1. A robot carrier structure for linear movement along a predetermined working area, supporting at least one industrial robot with several axes of movement said structure comprising:

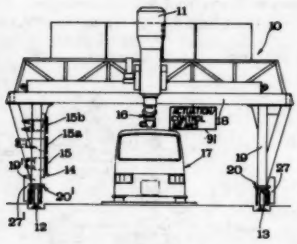
a. a portal wagon consisting of a robot carrier platform and lateral standards;

b. a plurality of carriages supporting said lateral standards of said portal wagon, each of said carriages being mounted on two wheels adapted to run on rails accommodated in underground runways with rolling surfaces located sub-

stantially level with the ground and a movable closure surface being provided for said underground runways;

c. motor means mounted in each of said carriages, connected to each other so as to constitute a perfectly synchronized means of operation of said wheels of said carriages;

d. motion transmission means for said two wheels of each carriage, driven by said motor means comprising a pair of shafts carrying at their opposed ends a pair of control pinions each meshing with a toothed wheel secured to each of said two wheels of said carriages, whereby the rotation of said wheels is perfectly synchronized and the



linear movement of said structure is perfectly controlled to obtain a high degree of accuracy in positioning said carrier structure;

wherein each of said wheels of said carriages comprises a pair of rims defining a groove with a central wheel body with a convex profile, the inner portions of said rims intended to engage the flanks of said rail and being coated with self lubricating metallic material, and pair of rings of elastomeric material located between said rims and said wheel body to project from the profile of said wheel body to increase the adherence of said wheel to said rail.

4,702,662

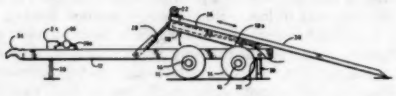
TRAILER

Lloyd D. Marlett, R.D. #1 Box 200, Walton, N.Y. 13856

Filed Jun. 24, 1985, Ser. No. 747,571

Int. Cl.[4] B60P *1/32*

U.S. Cl. 414—477 **5 Claims**



1. A utility trailer capable of being towed by a conventional automobile or small truck for transporting an automobile comprising:

a rigid primary supporting frame having a front end and a rearward end, said primary frame being substantially rectangular and including a pair of parallel, longitudinal side members, and a pair of parallel, laterally disposed end members connected to said longitudinal side members, said primary frame having attached there to first and second forward members angularly joined together at one end forming an apex and connected to the front end of the primary frame at their opposite ends;

at least one axle attached to said primary frame;

a pair of wheels rotatably connected to said axle;

trailer hitch connected to the apex of said first and second forward members connected to said front end of said primary frame for coupling said trailer to said conventional automobile or truck;

a rigid, substantially rectangular auxiliary frame having a front end and a rearward end and including a pair of parallel, longitudinally disposed side members, said auxiliary frame pivotally attached at its rearward end to said primary frame, said auxiliary frame longitudinal side members being supported on top of said primary frame side members whenever said auxiliary frame is parallel to said primary frame;

pivotal brake means connected at a rearward terminal end of the primary frame for engaging the ground to prevent movement of the trailer during loading or unloading;

a rigid, flat carrier coupled to said auxiliary frame and moveable in a longitudinal direction relative to said auxiliary frame;

means connected to said primary frame and at a forward terminal end of said auxiliary frame for pivotally moving said auxiliary frame; and

means for moving said carrier longitudinally relative to said auxiliary frame;

said carrier being sized in length relative to said auxiliary frame and said primary frame that one end of the carrier engages the ground at a shallow angle suitable for loading or unloading a conventional automobile whenever the auxiliary frame is raised to its upper most pivotal position and the carrier is moved to its rear most position relative to the auxiliary frame.

4,702,663

REMOTELY-OPERABLE CARRIER ARRANGEMENT FOR RECEIVING AND POSITIONING REMOTE-HANDLING APPARATUS

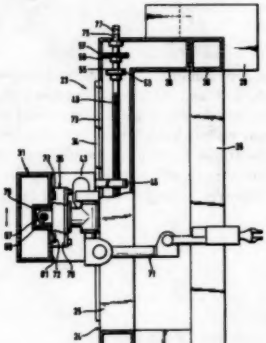
Joachim Mischke, Hanover, and Günter Schröder, Minden-Dützen, both of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany

Filed Feb. 14, 1986, Ser. No. 829,525

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1985, 3505193

Int. Cl.[4] B25J *5/04*

U.S. Cl. 414—618 **12 Claims**



1. A remotely-operable positioning and carrier arrangement for receiving and positioning remote-handling apparatus for use in large-area cells such as radioactively-charged large-area cells of a facility for reprocessing irradiated nuclear fuel, the large-area cells containing stationary racks for accommodating process components on which maintenance and service work is to be performed, the racks having an open front end face through which the components are accessible from outside of the rack, the remotely-operable positioning and carrier arrangement comprising:

a table-like base frame adapted so as to make the carrier arrangement transportable;

attachment means formed on said frame for removably suspending said carrier arangement on the particular rack in which work is to be performed so as to place said base frame in a vertical plane and ahead of said front end face;

said base frame defining an enclosed working field directly forward of said front end face of said stationary rack;

said base frame including legs formed thereon for bracing said carrier arrangement against the rack when said carrier arrangement is mounted thereon;

a first carriage movably mounted on said base frame for movement in the vertical direction across said working field and parallel to said frame, said first carriage having a side facing toward the rack;

a second carriage mounted in said first carriage for movement thereon in a direction transverse to said vertical direction; and,

operating means mounted on said second carriage and extendable through said front end face for operating on said process components.

4,702,664

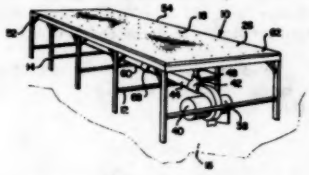
AIR-EQUIPPED TABLE

J. Paul Lukens, Jr., Perkasie, Pa., assignor to Phillocraft Company, Montgomeryville, Pa.

Continuation of Ser. No. 749,453, Jun. 27, 1985, abandoned. This application Nov. 4, 1986, Ser. No. 926,859

Int. Cl.[4] D06H 7/00; B26D 7/01

U.S. Cl. 414—676 **4 Claims**



1. An air-equipped table comprising

a frame;

a table top supported by the frame, the table top having a top surface and a bottom surface,

the table top comprising a lamination of a relatively thin top layer, a relatively thin bottom layer and an intermediate layer that is at least twice the thickness of the combined thickness of the top and bottom layers, the intermediate layer having a top in contact with the top layer and a bottom in contact with the bottom layer,

the table top intermediate layer being provided with a plurality of integral interconnected air channels arranged in a pattern to provide an air cushion that is substantially equally distributed about the top surface, the air channels being formed in the intermediate layer such that they communicate with the bottom of the top layer and they do not communicate with the bottom layer,

the interconnected air channels being positioned intermediate the said top surface and bottom surface,

the air channels being closed by the said top layer;

the table top having an air inlet in fluid communication with the integral air channels and a plurality of air outlet orifices in fluid communication with the integral air channels,

the orifices being arranged in a uniform pattern over the top surface of the table top and through the top layer,

each of the orifices penetrating the top layer of the table top and extending from the top surface of the table top to a portion of the air channels to direct air from the air channels to the said top surface; and

air system means supplying air at non-atmospheric pressure to the said air inlet;

whereby the air from the air system means is subdivided and substantially equally distributed over the top surface through the integral air channels and the plurality of orifices.

4,702,665

METHOD AND DEVICE FOR DETERMINING THE REFERENCE POSITIONS OF AN INDUSTRIAL ROBOT

Seiichiro Nakashima; Kenichi Toyoda, both of Hino; Shigemi Inagaki, Kokubunji, and Susumu Ito, Hino, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

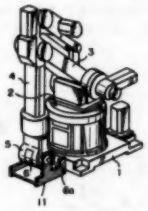
PCT No. PCT/JP84/00365, § 371 Date Mar. 11, 1985, § 102(e) Date Mar. 11, 1985, PCT Pub. No. WO85/00548, PCT Pub. Date Feb. 14, 1985

PCT Filed Jul. 16, 1984, Ser. No. 711,919

Claims priority, application Japan, Jul. 15, 1983, 58-127734

Int. Cl.[4] B25J 9/00

U.S. Cl. 414—730 **6 Claims**



2. A device for determining the reference positions of an industrial robot having a fixed base, a movable robot unit including a movable body mounted on the fixed base and robot arms, and a wrist front section arranged at the extremity of said movable robot unit and having a plurality of degree of freedom relative to the fixed base, said device comprising:

a reference position determining jig body located fixedly on datum surfaces formed in the fixed base; and

a plurality of reference positioning means for determining the reference positions of said wrist front section with respect to the directions of motion relative to the fixed base corresponding to the degrees of freedom of motion, said plurality of reference positioning means being disposed at reference positions on the jig body corresponding to the degrees of freedom of said wrist front section, the number of said reference positioning means being equal to the number of degrees of freedom of motion.

4,702,666

APPARATUS FOR OPENING AND CLOSING A VEHICLE DOOR WHICH IS LOCATED IN A LINE FOR MANUFACTURING A VEHICLE

Nomura Iwao, Kasugai; Takayuki Masuyama, Okazaki; Yasuo Tanigawa, and Hirofumi Hasimoto, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 616,235, Jun. 1, 1984, Pat. No. 4,636,136. This application Aug. 25, 1986, Ser. No. 899,880

Claims priority, application Japan, Jun. 8, 1983, 58-102380

Int. Cl.[4] B25J 11/00

U.S. Cl. 414—730 **8 Claims**

1. An apparatus for automatically opening and closing a door of a vehicle body which is transferred through or stopped at a predetermined position by a transport means for conveying the vehicle body in a plant, said apparatus comprising:

a first detachable device for supporting a lock member, the first detachable device being detachably mounted on the door and including:

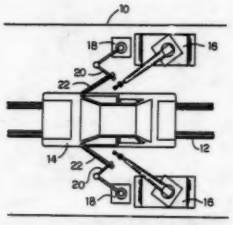
a base member having a first opening; and

the lock member having a first enlarged portion, a second enlarged portion and an engagement portion, the lock

member being selectively positioned at one of a first position and a second position, the engagement portion of the lock member being slidably mounted in the first opening of the base member, so that the second enlarged portion is in contact with the base member when the lock member is positioned at the first position;

a second detachable device for controlling the amount of opening of a vehicle door, the second detachable device being detachably mounted on the vehicle body and including;

an extending bracket having a second opening, the extending bracket being positioned at a lower position than the first detachable device in the vertical direction of the vehicle body, the second opening of the extending bracket being positioned under the first opening of the base member of the first detachable device when the door is positioned within a predetermined area, the engagement portion of the lock member being selectively positioned in the second opening of the extending bracket of the second detachable device during the first position of the lock member of the first detachable device, the lock member being



positioned at the first position in which the lock member is in the first and second openings to prevent the door from opening more than a predetermined amount, and the second position in which the lock member is not in the second opening to allow the door to open beyond the predetermined amount; and

an actuating device located independently from and cooperating with said first and second detachable devices and lock member for selectively forcing the lock member to the second position, the actuating device being located in the vicinity of the transport means and the predetermined position, the actuating device including;

an engagement member connected to the actuating device at one end thereof, the engagement member selectively engaging the first enlarged portion of the lock member and said actuating device forcing the lock member to the second position to open the door more than the predetermined amount, said first and second detachable devices preventing the door from being opened more than the predetermined amount when the lock member is positioned at the first position.

4,702,667

COMPLIANT COUPLING MECHANISM

Godfrey N. Hounsfield, Twickenham, and Anthony M. Williams, Iver, both of England, assignors to EMI Limited, Hayes, England

Filed Jan. 10, 1986, Ser. No. 817,579

Claims priority, application United Kingdom, Jan. 23, 1985, 8501654

Int. Cl.[4] B25J 17/02

U.S. Cl. 414—735 **5 Claims**

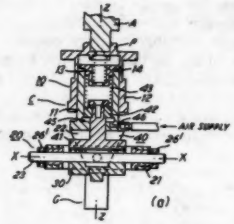
1. A compliant mechanism for coupling a robot gripper to a robot arm, said mechanism comprising:

means for supporting the gripper;

first compliant means to permit displacement of said support means relative to said arm along a first axis;

second compliant means to permit further displacement of said support means relative to said arm in at least one of a linear direction along and a rotational direction about at least one other axis;

locking means associated with said second compliant means to inhibit said further displacement;



means for monitoring said relative displacement along said first axis and for generating a signal whenever said displacement exceeds a pre-set amount; and

means for releasing said locking means in response to said signal to permit said further displacement.

4,702,668

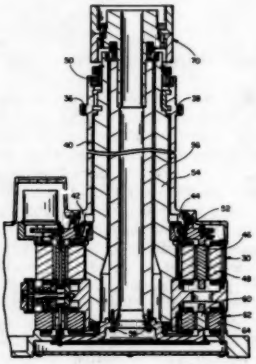
DIRECT DRIVE ROBOTIC SYSTEM

Brian R. Carlisle, Palo Alto; Carl R. Witham, Dublin; Donald R. Allan, Menlo Park, and John W. Meadows, Los Altos Hills, all of Calif., assignors to Adept Technology, Inc., San Jose, Calif.

Filed Jan. 24, 1985, Ser. No. 694,585

Int. Cl.[4] B25J 18/00

U.S. Cl. 414—744 R **13 Claims**



1. An articulated direct drive robotic manipulator providing rotation about first and second parallel axes, (J1, J2) said robot comprising first (30) and second (62) motors rotating about a common axis (J1) which is in common with the first axis (J1) of rotation of the manipulator, said common axis (J1) being perpendicular to the floor (10) on which the robot stands, the manipulator including a pedestal (16) comprising a base portion and a fixed central support column, said pedestal being coaxial with the first axis, the base portion (12, 14) of the pedestal including said first (30) and second (62) motors, a first linking arm (18) mounted atop said pedestal on a first column (40) rotating around and extending along the outside of said fixed central support column (54) for movement with said first column in a first plane perpendicular to the first axis (J1) about a joint centered at said first axis, said first motor (30) including

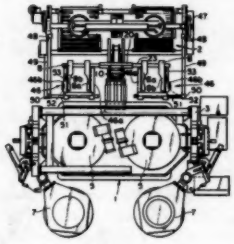
a rotor (46) directly coupled to said first linking arm (18) through said first column (40) for controlling said first linking arm's movement in said first plane, the end of said first linking arm (18) distal from the first axis supporting a second linking arm (20) and including a joint for allowing rotation of said second linking arm (20) about said second axis (J2), said second motor being coupled to said second axis joint through connecting means including a shaft (56) extending along the length of and rotating inside said fixed central support column (54) of said pedestal to rotate said second linking arm (20) about said second axis joint.

4,702,669

MECHANISM FOR TRANSFERRING CURED TIRES FROM TIRE PRESS TO POST-INFLATOR

Katsumi Ichikawa, Akashi, and Masahide Kanzawa, Kobe, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Oct. 24, 1985, Ser. No. 791,079
Int. Cl.[4] B65G *47/76*
U.S. Cl. 414—749 **4 Claims**



1. A mechanism for transferring cured tires from a tire press to a post-inflator, comprising:

a plurality of ejector arms located between said tire press and post-inflator;

means for moving said ejector arms horizontally toward and away from said tire press and vertically up and down in a receded position outside said tire press;

a plurality of receiver arms supported on said post-inflator; and

means for moving said receiver arms horizontally back and forth in parallel relationship with and at a level vertically spaced from said ejector arms, said receiver arms being spaced from each other by a predetermined distance to permit said ejector arms and a lower rim of said post-inflator to pass vertically therethrough wherein said means for moving said receiver arms is mounted on said post-inflator.

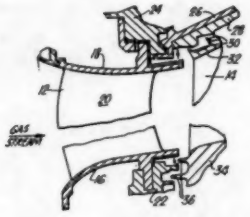
4,702,670

GAS TURBINE ENGINES

John L. Winter, Derby, England, assignor to Rolls-Royce, London, England

Continuation of Ser. No. 815,060, Dec. 31, 1985, abandoned. This application Mar. 20, 1987, Ser. No. 28,047
Claims priority, application United Kingdom, Feb. 12, 1985, 8503606
Int. Cl.[4] F01D *11/02*
U.S. Cl. 415—116 **3 Claims**

1. A gas turbine engine including a circumferential array of stator vanes, a rotor, a circumferential array of adjacent downstream rotor blades mounted in said rotor, and a casing including an inner and outer housing, the rotor blades being enclosed within said casing with a radial clearance between the blades and the casing, each stator vane having at least one platform, the at least one platform comprising two layers spaced apart to define a passage for the through flow of cooling air from a source of cooling air which is separate and distinct from a main gas flow and that is directed on to the circumferential array of stator vanes, a downstream end of said passage including means for directing the discharged relatively high temperature cooling air away from said rotor blades and into a leakage flow between a rotor portion corresponding to said at least one



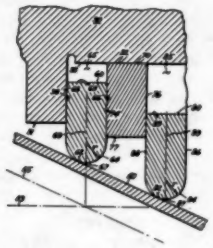
platform of the stator vane and a static portion of the engine, said leakage flow comprising a space between a said stator blade and said casing, with said discharge being oriented toward said casing so as to reduce gas flow leakage therebetween.

4,702,671

SLIP RING EXPANSION JOINT

Earl H. Brinkman, and Bruce L. Morrison, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 30, 1985, Ser. No. 739,408
Int. Cl.[4] F04D *29/12*
U.S. Cl. 415—134 **9 Claims**



1. A slip-type expansion joint for sealingly receiving a component through an opening in the expansion joint, comprising:

bore sealing means having an inner surface defining a hole therethrough, an outer surface for sealingly engaging a bore of a member in which the bore sealing means is adapted to be disposed and a lateral surface; and,

component sealing means having an inner surface defining a hole therethrough and a lateral surface for sealingly engaging the lateral surface of said bore sealing means, wherein the hole of the bore sealing means and the hole for the component sealing means are alignable for forming the opening in the expansion joint, and; further wherein a first portion of the inner surface of said component sealing means is relieved such that only a second portion of the inner surface of said component sealing means sealingly engages the component, along a line which is tangent to the component, whenever the component is received through the opening in the expansion joint wherein the inner surface of the component sealing means is in the shape of a U in cross section.

4,702,672

FLUID FLOW MACHINE

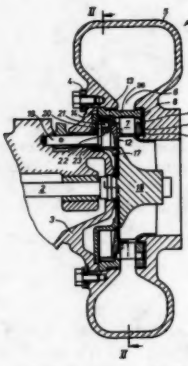
Werner Leicht, Stetten; Georg Ruetz, Immenstaad, and Juergen Giesselmann, Markdorf, all of Fed. Rep. of Germany, assignors to MTU Friedrichschafen GmbH, Friedrichschafen, Fed. Rep. of Germany

Filed Mar. 10, 1986, Ser. No. 837,696

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516738

Int. Cl.[4] F01D *17/16*

U.S. Cl. 415—164 12 Claims



1. A fluid flow machine, comprising fluid flow housing means, a radial rotor arranged in the housing means, said housing means including a radially extending annular channel means, adjustable guide blade means arranged in the annular channel means, said guide blade means being rotatably supported by bearing pins in bearing bores of housing parts forming the annular channel means, mutually oppositely disposed bearing ring means being embedded in the housing parts forming the annular channel means, said bearing ring means being rigidly coupled at one another by connecting webs into a one-piece structural unit forming a guide blade carrier means, said bearing ring means containing the bearing bores for a bearing support of the guide blade means on both sides, and the surfaces of said bearing ring means forming lateral flow surfaces within the area of the guide blade means.

4,702,673

METHOD FOR ASSEMBLY OF TANGENTIAL ENTRY DOVETAILED BUCKET ASSEMBLIES ON A TURBOMACHINE BUCKET WHEEL

Kurt L. Hansen, Schenectady, and Ronald J. VanDenburgh, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 18, 1985, Ser. No. 788,996

Int. Cl.[4] F04D *29/34*

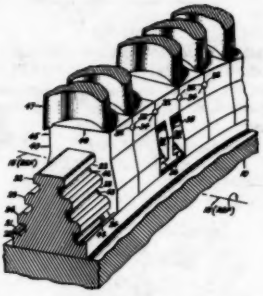
U.S. Cl. 416—215 16 Claims

1. A method for assembling a plurality of bucket assemblies onto a wheel of a turbomachine, such that a predetermined circumferential force is obtainable on the plurality of bucket assemblies when assembled, the wheel defining at least one circumferentially extending dovetail wheel hook, the at least one wheel hook being relieved over a predetermined circumferential portion of the wheel to form a notch fo receiving bucket assemblies to be assembled onto the wheel, and the bucket assemblies including base portions respectively defining at least one dovetail bucket hook mateable with the at least one wheel hook, the base portions further defining lateral faces on opposite circumferential sides thereof which abut lateral faces of adjacent base portions when assembled onto the wheel, comprising:

reducing the distance between the lateral faces on the base portions of the plurality of bucket assemblies;

arranging the plurality of bucket assemblies onto the wheel;

disposing a closure piece having a base portion mateable with the relieved portion of the at least one wheel hook onto the wheel at the notch, the closure piece further defining lateral faces on opposite circumferential sides thereof which abut lateral faces of respective adjacent base portions when the closure piece is disposed on the



wheel, the closure piece having a predetermined circumferential distance between the lateral faces of the closure piece whereby the predetermined circumferential force on the plurality of bucket assemblies may be obtained by appropriately sizing the predetermined distance between the lateral faces of the closure piece;

increasing the distance between the lateral faces on the base portions such that the lateral faces on the base portions exert the predetermined circumferential force on the plurality of bucket assemblies assembled on the wheel.

4,702,674

METHOD OF ACCURATELY SETTING THE FLOW RATE OF A VARIABLE-FLOW METERING PUMP, AND A METERING PUMP EMPLOYING THE METHOD

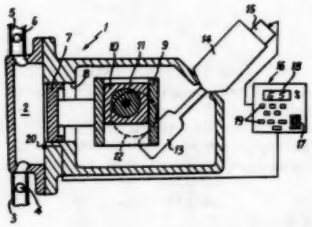
Guy R. Fontaine, Paris; Max A. Malizard, St. Rémy l'Honoré, and Bernard R. Demouron, Senlis, all of France, assignors to Dosapro Milton Roy, Pont-Saint-Pierre, France

Filed Sep. 29, 1986, Ser. No. 913,202

Claims priority, application France, Oct. 4, 1985, 85 14733

Int. Cl.[4] F04B *49/06*; B67D *5/30*; G04C *5/08*

U.S. Cl. 417—44 10 Claims



1. A method of accurately setting the flow rate of a variable-flow metering pump, said setting being expressed as a fraction of the pump's maximum flow rate, and said pump including a pumping member coupled to a transmission element driven with a rectilinear reciprocating motion and creating a direct and positive link between said pumping member and a reversible synchronous electric motor which is powered by AC at fixed frequency, said method consisting in using a micro-

processor to control the power supply to the drive motor for each pump cycle in accordance with the following steps:

a first step in which the power is applied to the motor to rotate it in a first direction and in which said power is maintained for a first period of time determined from a fixed predetermined origin position of the moving equipment in the pump;

a second step in which the power applied to the motor at the end of said first period of time is switched to reverse the direction in which the motor rotates, and in which said reverse power is maintained for a period of time equal to that required by the moving equipment of the pump to return to its origin position;

a third step in which the power supply to the motor is turned off at the end of said second period of time and in which the power is maintained off for a third period of time corresponding to the difference between the sum of said first and second periods of time and a pumping cycle time which is not less than said sum:

said first period of time and said cycle time being selected by the microprocessor as a function of the desired fraction of the maximum flow rate as indicated to the microprocessor, and being selected from a plurality of time values stored in the microprocessor memory and each equal to an integer multiple of one half of the period of the AC power supply.

4,702,675

PERISTALTIC PUMP PROVIDED WITH A PRESSURE MEASUREMENT DEVICE

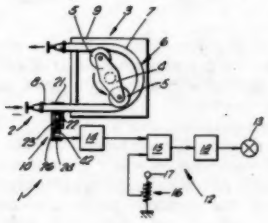
Mauro Aldrovandi, Mirandola; Domenico Cianciavicchia, Teramo, and Renato Pedrazzi, Mirandola, all of Italy, assignors to Hospal A.G., Meyzieu, France

Filed Aug. 2, 1985, Ser. No. 761,933

Claims priority, application Italy, Aug. 7, 1984, 53709/84[U]

Int. Cl.[4] F04B *43/12*

U.S. Cl. 417—63 **4 Claims**



1. In apparatus for sucking a liquid in a tubular conduit comprising:

(a) an elasticity deformable tube in series with said tubular conduit;

(b) a peristaltic pump including a rotor with rollers which act on the external surface of said elastically deformable tube, and

(c) means detecting the negative pressure of the liquid sucked in the said elastically deformable tube ahead of the said pump, the improvement wherein said negative pressure detecting means comprise:

(d) a fixed element adapted to define a reference for a section of said elastically deformable tube which is not subjected to the action of said rollers;

(e) a movable element opposite said fixed element to define a gap in which it is possible to place a section of the said elastically deformable tube; said movable element being adapted to move in a radial direction to said section of the tube;

(f) means adapted to maintain said movable element in contact with said section of said elastically deformable tube and to allow its movement in said radial direction;

(g) means responsive to the relative positions of said movable element and said fixed element, for emitting an electric signal depending on the deformation of said section of the tube caused in operation of the pump by the pressure of the said pumped liquid;

(h) means defining a receptable to receive said section of the elastically deformable tube, a base to said receptacle and means defining a hole in said base; wherein said fixed element is the lid of said receptacle and wherein said movable element is a piston sliding axially within said hole in the base of the said receptacle, said piston facing towards said lid; and

(i) detent means for connecting said lid and said receptacle, comprising a tooth on the lid and means defining a corresponding cavity in an elastically deformable element joined to said receptacle.

4,702,676

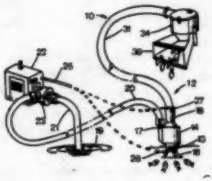
LIQUID DRIVEN PUMP OR PROPULSIVE APPARATUS

Alan P. Westfall, Calgary, and Robert J. Roe, Richmond, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 661,223, Oct. 15, 1984, abandoned. This application Oct. 11, 1985, Ser. No. 786,628

Int. Cl.[4] F04F *5/22*

U.S. Cl. 417—87 **11 Claims**



1. A propulsive apparatus for displacing a main liquid, the apparatus having:

(a) a duct extending along a longitudinal duct axis for receiving the main liquid, the duct having a duct side wall to define in part a mixing portion having a constant cross-sectional area, the duct side wall also defining in part inlet and outlet portions spaced on upstream and downstream sides respectively of the mixing portion,

(b) a driving liquid manifold cooperating with the duct and adapted to receive pressurized driving liquid,

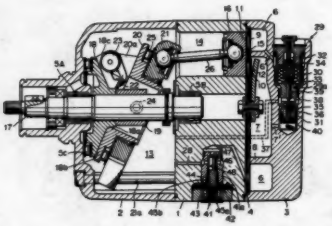
(c) first and second sets of inwardly facing jet nozzles disposed adjacent one transverse plane of the duct and being spaced equally from the duct axis, the jet nozzles having outlets essentially flush with the duct side wall and ajacent the mixing portion, the nozzles communicating with the manifold to pass the driving liquid into the mixing portion, the first and second sets of jet nozzles having respective first and second jet axes inclined at respective first and second angles to the duct axis to intersect the duct axis, in which the first angle is greater than the second angle, the first and second sets of jet nozzles alternating with each other and extending peripherally around the side wall so that at least one nozzle of the first set alternates with at least one nozzle of the second set, the two sets of jet nozzles having a total cross-sectional area which is within a range of approximately 3% to 15% of the cross-sectional area of the mixing portion.

4,702,677

VARIABLE DISPLACEMENT WOBBLE PLATE TYPE COMPRESSOR WITH IMPROVED WOBBLE ANGLE RETURN SYSTEM

Kenji Takenaka; Shinichi Suzuki; Hiroaki Kayukawa, and Masaki Ohta, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Feb. 26, 1987, Ser. No. 19,476
Claims priority, application Japan, Mar. 6, 1986, 61-49472
Int. Cl.[4] F04B *49/06*
U.S. Cl. 417—222 5 Claims



1. A variable displacement wobble plate type compressor comprising:

a housing element having therein a suction chamber for a refrigerant before compression and a discharge chamber for a refrigerant after compression;

a cylinder block defining therein a plurality of cylinder bores arranged so as to surround an axial drive shaft and having therein associated reciprocatory pistons disposed so as to draw the refrigerant from said suction chamber and to then discharge the compressed refrigerant into said discharge chamber;

a crankcase having defined therein a chamber communicating with said cylinder bores and containing therein a drive plate mounted in such a manner that it is capable of rotating with said drive shaft as well as changing an inclination thereof with respect to said drive shaft and a non-rotating wobble plate held by said drive plate;

a plurality of connecting rods connecting between said wobble plate and said pistons;

a first passageway means for fluidly communicating said chamber of said crankcase with said discharge chamber of said housing element;

a first valve means arranged in said first passageway means, for opening and closing said first passageway means;

a second passageway means for providing a fluid communication between said chamber of said crankcase and said suction chamber of said housing element;

a second valve means arranged in said second passageway means, for varying an extent of opening of a part of said second passageway means;

a first valve control means for controlling an operation of said first valve means in response to a change in fluid pressure in said chamber of said crankcase with respect to a first predetermined pressure level, said first valve control means moving said first valve means to a first position opening said first passageway means when pressure in said chamber of said crankcase is less than said first predetermined pressure level, and to a second position closing said first passageway means when pressure in said chamber of said crankcase is larger than said first predetermined pressure level, and;

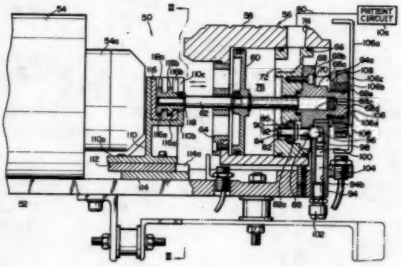
a second valve control means for controlling an operation of said second valve means in response to a change in fluid pressure in said chamber of said crankcase with respect to a second predetermined pressure level, said second valve control means moving said second valve means to a first position increasing the extent of opening of said part of said second passageway means when pressure in said chamber of said crankcase is larger than said second predetermined pressure level, and to a second position decreasing the extent of opening of said part of said second passageway means when pressure in said chamber of said crankcase is not larger than said second predetermined pressure level.

4,702,678

OSCILLATOR FOR VENTILATION APPARATUS FOR ARTIFICIAL RESPIRATOR

Tran N. Phuc, Ohmiya, Japan, assignor to Senko Medical Instrument Mfg. Co. Ltd., Tokyo, Japan

Filed May 22, 1986, Ser. No. 866,225
Claims priority, application Japan, May 29, 1985, 60-80621[U]
Int. Cl.[4] F04B *17/00*
U.S. Cl. 417—360 5 Claims



1. An oscillator for imparting oscillation at a high frequency to respiratory gas in a pneumatic circuit of a high frequency oscillatory ventilation apparatus for artificial respiration, said oscillator comprising:

(a) an elongated base plate;

(b) a motor mounted on said base plate and having an output shaft for reciprocal movement along an axis thereof;

(c) a cylinder unit comprising a cylinder adapted to be connected to the pneumatic circuit, a piston rod slidably extending through said cylinder along an axis thereof, and a piston fixedly mounted on said piston rod and received in said cylinder for sliding movement therealong for applying oscillation to the pneumatic circuit;

(d) a first engaging means mounted on said output shaft of said motor;

(e) a second engaging means mounted on said piston rod, said first engaging means engaging said second engaging means to connect said output shaft to said piston rod to reciprocally move said piston, said first engaging means engaging said second engaging means in a manner to allow said second engaging means to move out of engagement therewith in a direction perpendicular to an axis of said piston rod;

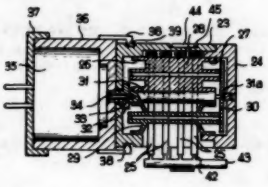
(f) a third engaging means on said base plate, there being provided a fourth engaging means on said cylinder, said third engaging means engaging said fourth engaging means in a manner to allow said fourth engaging means to move out of engagement therewith in said direction; and

(g) fastening means for releasably holding said fourth engaging means against movement relative to said third engaging means, thereby holding said cylinder unit against movement relative to said base plate and said motor.

4,702,679
PERISTALTIC PUMP

Edouard Malbec, Logis de Chalonne 16160 Le Gond, Pontouvre, France

Continuation of Ser. No. 269,337, Jun. 1, 1981, abandoned. This application Mar. 19, 1984, Ser. No. 591,225
Claims priority, application France, Jun. 3, 1980, 80 12292
Int. Cl.[4] F04B *43/12, 45/08*
U.S. Cl. 417—475 **21 Claims**



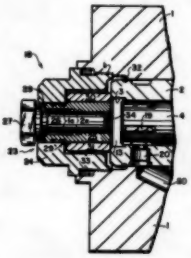
1. A peristaltic pump comprising
a cylindrical tubular housing (**1, 23**) formed with a circumferential groove (**10**) in the inner wall thereof;
a motor (**4, 35**) secured to the housing and having a central shaft (**6; 31–34; 52–54**) extending axially into the housing;
a plurality of rollers (**15, 16, 29, 28, 46***a*, **46***b*) located in the housing, radially adacent the shaft and engaging the central shaft at an engagement line;
an elastic tube means (**11**) located in the groove (**10**);
and wherein
the inner wall surface of the housing is formed with a pair of runways (**13, 14; 26, 27**) axially located along both sides of the groove (**10**);
the rollers have an axial length spanning the groove and engaging the runways, and
wherein at least one of the rollers comprises
a solid rigid center section in alignment with the groove, the rigid center section of said at least one roller engaging the elastic tube means; and
elastically deformable end sections in engagement with the runways.

4,702,680
FUEL INJECTION PUMP

Wilfried Böhringer, Stuttgart, and Franz J. Eheim, deceased, late of Stuttgart, Fed. Rep. of Germany (by Helga R. Eheim, heir), assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 1, 1986, Ser. No. 858,445
Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517521
Int. Cl.[4] F04B *7/04, 39/10;* **F16J** *10/00*
U.S. Cl. 417—490 **5 Claims**

1. A fuel injection pump for internal combustion engines, comprising:
a pump piston having an end face defining one surface of a working chamber;
a piston-guiding member including a bore receiving said pump piston and having an inside wall defining another surface of said working chamber;
a pump casing having a threaded bore;
a sealing sleeve having an end face;
a screw cap which can be threaded into said threaded bore of said pump casing and which seals said working chamber from the exterior and accommodates said sealing sleeve;
said screw cap comprising a stopper having an external thread for screwing into said thereaded bore;
said stopper having an internal threaded bore;
said screw cap further comprising a venting plug which can be screwed coaxially into said internal bore of said stopper;
sealing sleeve being tightened at said end face by said screw cap onto said piston-guiding member in order to seal said working chamber;
said stopper comprising an externally threaded ring having a stepped internal bore forming an axial annular surface;

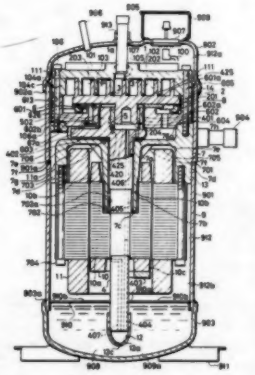


a threaded sleeve disposed coaxially in said stepped internal bore and having an internal thread, said threaded sleeve accommodating said venting plug; and
said sealing sleeve abutting against said axial annular surface formed by said step.

4,702,681
MOTOR DRIVEN SCROLL-TYPE MACHINE WITH COOLING AND LUBRICATING STRUCTURE

Tsutomu Inaba; Masahiro Sugihara; Toshiyuki Nakamura; Masahiko Oide; Tadashi Kimura, and Norihide Kobayashi, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 717,771, Mar. 29, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 916,078
Claims priority, application Japan, Mar. 30, 1984, 59-64585
Int. Cl.[4] F04C *18/04, 29/02*
U.S. Cl. 418—55 **4 Claims**



1. A scroll-type compression machine comprising:
a shell having an inner and an outer surface;
a motor housed in said shell;
a stationary scroll housed in said shell;
an orbiting scroll housed in said shell and being driveable by said motor in order to control a volume of compressible gas in cooperation with said stationary scroll;
a frame comprising an outer circumferential portion, an upper portion and a lower portion, said outer circumfer-

ential portion of said frame being engaged with said inner surface of said shell and said upper portion of said frame supporting said stationary scroll;

a motor mounting leg means forming a part of and projected from said outer circumferential portion of said frame for supporting a motor for driving said orbiting scroll, said motor mounting leg means comprising a plurality of leg-like projections, each having distal end faces and an outer peripheral surface, said projections being formed on said outer circumferential portion of said frame independently of each other;

a gas passage means formed in said motor mounting leg means; and

a main shaft having a lower end dipped into an oil pan formed in said bottom portion of said shell, and axial oil feed hole communicating with a bearing portion that connects the main shaft and said orbiting scroll, and a central portion supported at a central portion of said frame, said main shaft driveably connecting said motor and said orbiting scroll to each other;

wherein said motor is fixedly supported to said distal end faces of said leg-like projections and wherein axial grooves are formed in said outer peripheral surfaces of said leg-like projections to form return passages through which lubricant oil is returned from said bearing portion.

4,702,682

MOTOR DRIVEN SCROLL-TYPE MACHINE WITH COMPACT OIL LUBRICATING STRUCTURE

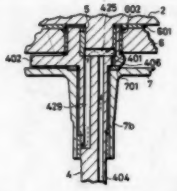
Tsutomu Inaba; Masahiro Sugihara; Toshiyuki Nakamura; Masahiko Oide; Tadashi Kimura, and Norihide Kobayashi, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 717,771, Mar. 29, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 916,081

Claims priority, application Japan, Mar. 30, 1984, 59-64585

Int. Cl.[4] F04C *18/04, 29/02*

U.S. Cl. 418—55 **5 Claims**



1. A scroll compression machine comprising:

a sealed shell;

a first scroll housed in said sealed shell, said shell having an oil pan;

a second scroll having a shaft and being housed in said sealed shell, and, when driven, orbiting to control a volume of gas in cooperation with said first scroll;

a first thrust bearing for supporting a thrust force of said second scroll;

a main shaft having at one end an eccentric hole for supporting rotatably said shaft of said second scroll and having a bushing disposed therein, the other end of said main shaft being dipped into said oil pan of said sealed shell, said main shaft being supported radially by at least a lower main bearing;

a second thrust bearing located proximate to said one end of said main shaft for supporting a thrust force of said main shaft;

a motor for serving as an orbiting drive source for said second scroll through said main shaft;

an oil passage means formed in said main shaft and structure to suck oil within said oil pan by means of the drive of said main shaft and, thereby, to lubricate the first thrust bearing and the bushing of said main shaft; and

an oil hole means located within said main shaft and communicating between said eccentric hole and the second thrust bearing for supplying a part of the oil, fed to said eccentric hole, directly to the second thrust bearing.

4,702,683

MOTOR DRIVEN SCROLL-TYPE MACHINE WITH AN ECCENTRIC BUSHING STRUCTURE FOR ENHANCING LUBRICATION

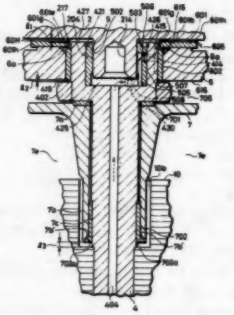
Tsutomu Inaba; Masahiro Sugihara; Toshiyuki Nakamura; Masahiko Oide; Tadashi Kimura, and Norihide Kobayashi, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 717,771, Mar. 29, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 916,082

Claims priority, application Japan, Mar. 30, 1984, 59-64585

Int. Cl.[4] F04C *18/04, 29/02*

U.S. Cl. 418—55 **5 Claims**



1. A scroll fluid machine comprising:

a compression chamber;

a motor;

a stationary scroll and an orbiting scroll within said compression chamber, said stationary scroll and said orbiting scroll having scroll directions opposite to each other but having the same configuration;

an orbiting scroll shaft formed on a side of the orbiting scroll, opposite to the side facing the stationary scroll and having an orbiting bearing surface;

a main shaft for supporting said orbiting scroll shaft, said main shaft having an eccentric hole formed at a predetermined eccentricity, said eccentric hole having an oil input port for supplying oil to a central portion of said hole and being adapted to receive said orbiting scroll shaft and to facilitate rotation of said orbiting scroll;

a bearing support, including a main bearing, for supporting said main shaft;

means for preventing said orbiting scroll from rotating about its own axis but allowing said orbiting scroll to rotate around said main bearing;

a rotatable bushing disposed in contact with the inner surface of said eccentric hole, said bushing being eccentric with respect to said eccentric hole at a predetermined displacement of said main shaft and having said orbiting scroll shaft disposed rotatably in said bushing;

series oil supply passage means, formed within said eccentric hole, said rotatable bushing and said main shaft, said passage means connecting the central portion of said eccentric hole for supplying oil to said main bearing, after lubricating said orbiting bearing surface, through an oil supply groove formed on the inside surface of said eccentric bushing,

wherein said main shaft is provided with means for restrict-

ing the maximum rotational movement of said eccentric bushing to rotation through a predetermined angular movement within said eccentric hole, and means for restricting the maximum movement of the eccentric bushing in the axial direction;

a cutout provided in said eccentric bushing to permit the flow of oil through said series oil supply passage means to said main bearing so that, even if the eccentric bushing is rotated and axially moved at a maximum by said restricting means, the oil supply passage from said eccentric bushing to the main bearing is always formed.

4,702,684

SLIDE VANE TYPE COMPRESSOR WITH INCREASED SUCTION PART-CROSS-SECTIONAL AREA

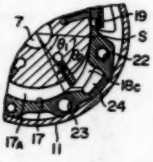
Kunihiko Takao; Kenichi Kawashima; Yozo Nakamura, all of Shimoinayoshi, and Atsuo Kishi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 694,052, Jan. 23, 1985, abandoned, which is a continuation of Ser. No. 432,804, Oct. 5, 1982, abandoned. This application Jul. 30, 1986, Ser. No. 891,045

Claims priority, application Japan, Oct. 7, 1981, 56-158819

Int. Cl.⁴ F04C *18/344*

U.S. Cl. 418—259 **13 Claims**



1. A slide vane type compressor comprising:

a cam ring formed with at least one working chamber closed at opposite sides thereof by two plates;

a drive shaft supported for rotation by said plates;

a rotor supported by said drive shaft and having rotary force transmitted therefrom, said rotor being arranged in said at least one working chamber in such a manner that an outer peripheral surface thereof is disposed close to an inner wall surface of said cam ring at least at one axial sealing portion thereof, said rotor being formed with a plurality of vane grooves located equiangularly to one another;

a plurality of vanes each inserted in one of said vane grooves for sliding movement for defining isolated compression chambers;

suction port means for introducing gas therethrough into said at least one working chamber, said suction port means having a suction terminal point angle extending from said axial sealing portion to a terminal point of the suction port means, as viewed in a direction of rotation of the rotor, said suction terminal point angle of said suction port means being greater than a geometrical suction terminal point angle geometrically determined in dependence upon the number of working chambers and the number of vanes so that the suction terminal point angle is advanced as compared with the geometrical suction terminal point angle whereby the suction port means has an effective cross-sectional flow area larger than a suction port means having the geometrical suction terminal point angle; said effective cross-sectional flow area being a minimal cross-sectional area which is defined by the suction port means and the vane positioned at said geometrical suction terminal point angle, said effective cross-sectional flow area of said suction port means becomes larger as said suction terminal point angle is advanced; and

discharge port means for discharging said gas from said at least one working chamber after being compressed.

4,702,685

ARRANGEMENT FOR FITTING A MOLD TOOL IN AN INJECTION MOLDING MACHINE

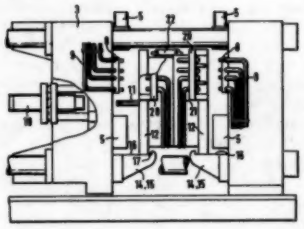
Peter Fruntzek, Götzenreuth, Fed. Rep. of Germany, assignor to Mannesmann Demag Kunststofftechnik, Schwaig, Fed. Rep. of Germany

Filed Nov. 22, 1985, Ser. No. 801,065

Claims priority, application Fed. Rep. of Germany, Dec. 6, 1984, 3444574; Jan. 14, 1985, 3501000

Int. Cl.⁴ B29C *45/10*

U.S. Cl. 425—182 **14 Claims**



1. In an injection molding machine having first and second mounting plates of which at least one said mounting plate is movable relative to the other said mounting plate, for carrying respective portions of a mold tool, a mold tool fitting arrangement which comprises:

a respective support means on each said mounting plate and having a guide surface extending perpendicularly away from said mounting plate, for supporting said mold tool in a condition of precise alignment in respect of height relative to said mounting plate, said support means on each said mounting plate comprising

a plurality of arms positioned to extend away from the respective said mounting plate in juxtaposed parallel relationship to each other, said arms on each mounting plate being arranged in displaced relationship to the arms on the other mounting plate whereby when said mounting plates are in a position of being brought towards each other, said arms on each mounting plate extendable into gaps formed between said arms on the other oppositely disposed mounting plate;

lateral guide means on said mounting plates for lateral alignment of said mold tool, said lateral guide means having guide surfaces which converge towards the respective mounting plate and towards a centre line thereof and which are adapted to co-operate with side edges of the mold tool whereby, when said movable mounting plate is moved from a spaced-apart condition of said mounting plates for freely receiving said mold tool therebetween towards the other mounting plate, each said mold tool portion is displaceable on said respective guide surface of said support means towards said respective mounting plate with said lateral guide surfaces providing for precise lateral alignment of said mold tool portions with said mounting plates;

means for fixing said respective mold tool portions on said respective mounting plates; and

connector means on said mold tool a said machine, said connector means on said mold tool and said connector means on said machine adapted to be coupled together in the operation of fitting said mold tool on said machine, to provide operational communication between said mold tool and said machine.

9. In an injection molding machine having first and second mounting plates of which at least one said mounting plate is movable relative to the other said mounting plate, for carrying respective portions of a mold tool, a mold tool fitting arrangement which comprises:

a respective support means on each said mounting plate and having a guide surface extending perpendicularly away

from said mounting plate, for supporting said mold tool in a condition of precise alignment in respect of height relative to said mounting plates;

lateral guide means on said mounting plates for lateral alignment of said mold tool, said lateral guide means having guide surfaces which converge towards the respective mounting plate and towards a centre line thereof and which are adapte to co-operate with side edges of the mold tool whereby, when said movable mounting plate is moved from a spaced-apart condition of said mounting plates for freely receiving said mold tool therebetween towards the other mounting plate, each said mold tool portion is displaceable on said respective guide surface of said support means towards said respective mounting plate with said lateral guide surfaces providing for precise lateral alignment of said mold tool portions with said mounting plates;

means for fixing said respective mold tool portions on said respective mounting plates;

connector means on said mold tool and said machine, said connector means on said mold tool and said connector means on said machine adapted to be coupled together in the operation of fitting said mold tool on said machine to provide operational communication between said mold tool and said machine; and

a mold tool carriage adapted to be moved to said injection molding machine in lateral relationship therewith and having a surface for displaceably supporting said mold tool and a pushing means for pushing said mold tool into a position between said mounting plates from the side of said machine, wherein the surface of said tool carriage comprises first and second mutually parallel rails adapted to co-operate with edges of said mold tool, said first rail being associated with one of mounting plates and said second rail being displaceable in a transverse direction with respect to said first rail.

4,702,686

NOZZLE FOR A SYNTHETIC PLASTIC INJECTION MOLDING MACHINE

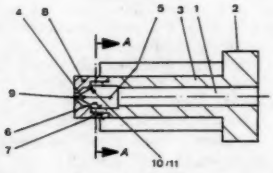
Kurt Gauler, Egelsbach, Fed. Rep. of Germany, assignor to Incoe Exp. Inc., Fed. Rep. of Germany

Filed Jul. 12, 1985, Ser. No. 754,295

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425660

Int. Cl.[4] B29C *45/20*

U.S. Cl. 425—190 **2 Claims**



1. A nozzle for synthetic plastic injection molding machines comprising:

a shaft with a tip and flow channel for the transport of plastic material;

said shaft having a tubular segment terminating in a frontal orifice;

a small plate mounted in the frontal orifice dividing the flow channel into two partial channels prior to the tip, said small plate having a rectangular area and an area tapering to a frontal point from a transition point of said rectangular area, where said frontal point protrudes past the tip of the shaft; and

means for holding said small plate in place comprising a nozzle cap with an injector orifice mounted on said shaft tip configured to hold said small plate in place;

said tubular segment having an internal bore and an external bore at the frontal orifice with said internal bore serving as a seat for the small plate and the external bore serving as a seat for said nozzle cap.

4,702,687

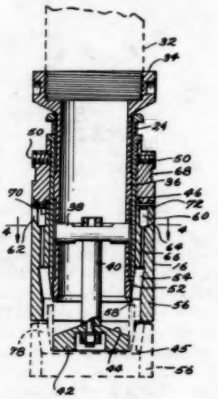
FOOD FORMING DEVICE

Gilbert A. Wheeler, Moneta; Gregg A. Church; Charles L. Tucker, both of Bedford, and William R. Ward, Vinton, all of Va., assignors to McCormick & Company, Inc., Hunt Valley, Md.

Filed Apr. 23, 1985, Ser. No. 726,270

Int. Cl.[4] A21C *11/00*

U.S. Cl. 425—227 **6 Claims**



1. A device for forming a food product comprising,

a nozzle having a longitudinal axis and a first end for connection to a slurry supply means and a second end, sleeve means disposed about the exterior of said nozzle and having a longitudinal axis, said sleeve means being movable axially relative to said nozzle between a retracted and a forward position, said sleeve means including a forming end disposed radially outwardly of said nozzle and means for delivering fluid under pressure between said forming end of said sleeve means and said nozzle to assist in discharging the slurry from said sleeve means,

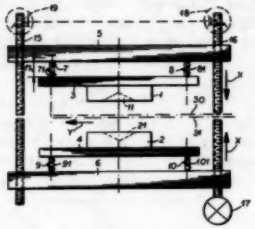
said sleeve means including a severing end disposed radially inwardly of said forming end, said sleeve means housing an annular channel located between severing end and said forming end, said sleeve means further including a fluid distribution chamber extending entirely around said sleeve means, said distribution chamber being in flow communication with said annular channel, said means for delivering fluid under pressure being connected to said distribution chamber, said distribution chamber being annular in shape and said flow communication with said annular channel having a large number of closely spaced elongated bores formed in said sleeve means with said bores being substantially evenly spaced about the sleeve means and extending substantially parallel to said axis of said sleeve means.

4,702,688

APPARATUS FOR PRODUCING ARTICLES FROM A SYNTHETIC RESIN

Bernd Schenk, Eibenweg 7,, D-7517 Waldbronn, Fed. Rep. of Germany

Filed Apr. 15, 1986, Ser. No. 852,282
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1985, 3513388
Int. Cl.[4] B28B 3/00
U.S. Cl. 425—450.1 13 Claims



1. A mold-closing and holding mechanism for an apparatus for producing shaped articles from a thermoplastic material, which comprises:

respective drive members movable toward and away from one another;

a respective mold half mounted on each of said members and aligned with the other mold half to define a mold cavity upon movement of said members toward one another within which a respective shaped article is formed from said material;

drive means in the form of a high-overload-capacity electric motor mechanically connected to said members for forcing said members toward one another to close a mold formed by said mold halves, said drive means being haltable upon closure of said mold to maintain the mold closed, and for subsequently drawing said mold halves apart; and

a respective plurality of force-storing elements in the form of compression springs connecting each of said mold halves with the respective one of said members and stressed upon closure of the mold by the movement of said members toward one another to press said mold halves against one another while said mold is maintained closed and after halting of said drive means to automatically compensate for dimensional tolerances of the mold upon mold closure.

4,702,689

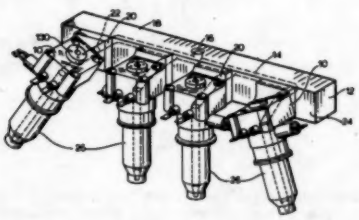
SIDE MOUNTED MANIFOLD BLOCK FOR VARIABLE ORIENTATION OF INJECTION MOLDING NOZZLE

Harald H. Schmidt, Georgetown, and Rory McDowall, Acton, both of Canada, assignors to Mold-Masters Limited, Georgetown, Canada

Filed Dec. 15, 1986, Ser. No. 941,828
Claims priority, application Canada, Dec. 1, 1986, 524208
Int. Cl.[4] B29C 45/22
U.S. Cl. 425—548 6 Claims

1. In an injection molding system having an elongated manifold and a plurality of nozzles, the manifold having a longitudinal melt bore extending from an inlet to a plurality of outlet bores, each outlet bore leading to an outlet on a common surface of the manifold, each nozzle being seated in a cavity plate and having a central bore with an inlet and an outlet in alignment with a gate leading to a common cavity, an elongated valve pin having a driven end and a tip end being mounted in the central bore of each nozzle, the driven end of the valve pin being operatively connected to valve pin actuating mechanism whereby the valve pin is reciprocated between a retracted open position and a closed position wherein the tip end of the valve pin is seated in a respective gate, the improvement wherein;

the outlet bores in the manifold extend laterally from the longitudinally bore and the outlets are on a side surface of the manifold, a plurality of spaced manifold offset blocks are secured to said side surface of the manifold, each manifold offset block having an inlet surface and an outlet surface with a melt duct extending therebetween, the melt duct having an inlet on the inlet surface and an outlet on the outlet surface, the inlet surface of each manifold offset block being secured with a predetermined orientation to said side surface of the manifold with the inlet in alignment with one of the outlets from the manifold, the outlet surface of each manifold offset block having one of the nozzles secured thereagainst with the melt duct outlet in alignment with the inlet to the central bore of the nozzle,



each manifold offset block also having a straight valve pin bore with a first portion and a larger diameter second portion extending therethrough, the first portion of the valve pin bore having a diameter to snugly receive a respective valve pin therethrough, the second portion of the valve pin bore being equal in diameter to the central bore of the nozzle and extending to the outlet on the outlet surface in alignment with the central bore of the nozzle, the melt duct extending through each manifold offset block from the inlet surface joining the enlarged second portion of the valve pin bore and having a smoothly curved bend whereby the nozzle secured against the manifold offset block is laterally offset relative to the manifold, the inlet surfaces of the manifold offset block being secured to the side surface of the manifold to allow slight lateral movement therebetween to provide for thermal expansion of the manifold

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4,702,690

ULTRA-MINIATURE COLLAPSIBLE BUTANE FUELED MANTLE LANTERN

Dale C. Sommers, 3013 S. Ogden St., Englewood, Colo. 80110; Frank L. Hibberd, and Doreen M. Jayko, both of 1525 Cleveland Pl., Denver, Colo. 80202

Filed Jul. 21, 1986, Ser. No. 887,534
Int. Cl.[4] F21H 7/00
U.S. Cl. 131—110 1 Claim

1. An improved, portable, collapsible gas lamp of the type employing an incandescent mantle, structured with a removeable "fuel cell" as is embodied as a disposable or refillable butane, pocket size cigarette lighter; comprised of

a fuel cell guide flange and shoulder, centrally located upon the uppermost face of a flat plate base plate; and

a closure-fitted, hinged flap door, located upon the lowermost face of said flat base plate, provided in conjunction with said fuel cell guide flange; and

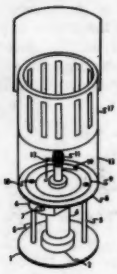
a series of parallel, upright posts, which individually attach to, and vertically project from, the uppermost face of said base plate, and which are each individually attached to a flat plate yoke at said posts uppermost ends; and

a cylindrical glass chimney, surrounding said incadescent mantle, which is supported by parallel second and third

flat plate members, which individually and supportively reside above and below said glass chimney; and

a flat plate yoke, residing atop said second flat plate member, and said yoke being contained inwardly within said glass chimney, and the uppermost ends of said parallel posts are attached to siad yoke; and

a fuel cell receiver, sized to accomodate a pocket sized disposable cigarette lighter, which receiver is provided with a fuel cell gas outlet, and a fuel cell gas release valve lever depressor, and said receptacle is affixed upon the



undermost face of said second flat plate member, and said receptacle internally contains a piezoelectric spark ignitor, which operates in conjunction with said fuel cell gas release valve lever depressor; and

an incandescent mantle, mounted upon a vertical, perforated stand pipe, the base of said stand pipe is connected to the fuel cell receptacle gas outlet; and

a, vertically moveable, cylindrical sleeve-type perforated metallic, glass chimney protective shroud, with a folding wire handle attached surrounding said third flat plate and said glass chimney.

4,702,691

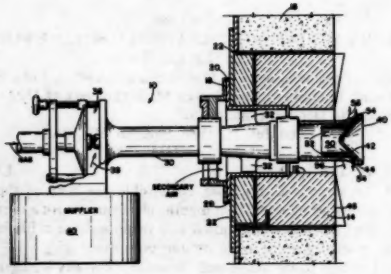
EVEN FLOW RADIAL BURNER TIP

Richard Ogden, Bristow, Okla., assignor to John Zink Company, Tulsa, Okla.

Continuation of Ser. No. 592,013, Mar. 19, 1984, abandoned. This application Aug. 7, 1986, Ser. No. 894,703

Int. Cl.⁴ F23C *7/00*

U.S. Cl. 431—187 **4 Claims**



1. A gas burner assembly for furnaces in which a fluid stream of pre-mixed fuel and aspirated combustion supporting air flows through a burner pipe, said burner pipe inserted into an oversized opening through the wall of said furnace forming an annulus for the passage of secondary air therethrough, a downstream end of said burner pipe closed, a plurality of circumferentially spaced openings in said burner pipe adjacent said downstream end to project said fluid stream issuing therefrom outwardly to intersect and said secondary air for burning along a radiant furnace wall surface surrounding said burner pipe; a flow divider means centrally positioned inside of said burner pipe at the said downstream end, said flow divider means comprising a thin walled metallic cylindrical member of length substantially less than the length of said burner tube, the upstream end of said flow divider means being of lesser diameter than said burner pipe forming a substantially undivided annular flow space between said cylindrical member and the inside diameter of said burner pipe and an undivided inside central space, the cross-sectional area of said annular flow space being less than the cross-sectional area of said inside central space, the downstream end of said flow divider flaring outwardly so as to be contiguous with the inner periphery of said burner pipe opposite said openings to divide said openings into downstream openings and upstream openings, said flow divider diving said fluid stream into an undivided downstream portion which passes through said inside central space of said flow divider thence outwardly through said downstream openings and a substantially undivided upstream portion of said fluid stream which passes through said annular flow space thence through said upstream openings.

4,702,692

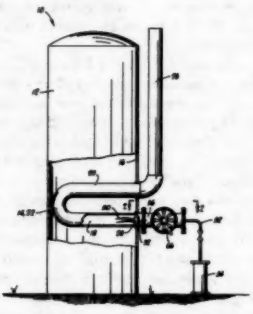
AIR REDUCTION CONTROL FOR OIL-TREATING VESSELS

Virgil D. Burns, and Albert E. Martin, both of Odessa, Tex., assignors to Conoco Inc., Ponca City, Okla.

Filed Mar. 26, 1985, Ser. No. 716,085

Int. Cl.⁴ F23D *14/82*

U.S. Cl. 431—346 **18 Claims**



1. A heater apparatus, comprising:

a vessel;

a burner for heating a material contained in said vessel;

air intake passage means for directing air to said burner;

a flame arrester operatively associated with said air intake passage means for preventing flames from said burner from extending past said flame arrester; and

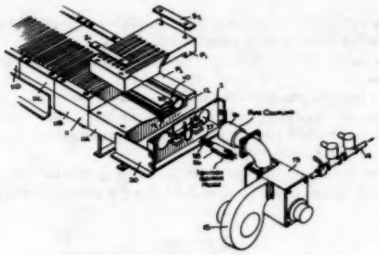
an air damper means for controlling a flow rate of intake air drawn through said flame arrester, said air damper means including:

a. a fixed circular first plate having a first plurality of circumferentially spaced plate openings disposed therethrough;

b. a rotatable circular second plate coaxially mounted relative to said first plate, and having a second plurality of circumferentially spaced plate openings disposed therethrough, said second plate being rotatable relative to said first plate between an open first position wherein said second plurality of plate openings is in registry with said first plurality of plate openings, and a second fully closed position wherein said first plurality of plate openings is substantially completely blocked by said second plate; and

c. gasket means between said first and second plates for
(i) sealing between said first and second plates substantially preventing any air flow through said first plurality of plate openings when said second plate is in its said fully closed position, and
(ii) creating a frictional force which must be overcome to rotate said second plate relative to said first plate.

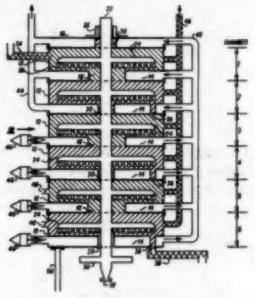
4,702,693
GAS-FIRED INFRARED HEATER
Joseph Fraioli, 8 Seymour Pl., White Plains, N.Y. 10605
Filed Dec. 3, 1986, Ser. No. 937,220
Int. Cl.[4] F23D *14/12*
U.S. Cl. 431—348 **9 Claims**



1. A gas-fired infrared heater comprising:
A. a ribbon-type burner constituted by a metal pipe supplied with an air-gas mixture, a pair of parallel metal plates projecting laterally from a longitudinal slot on the pipe to define an outlet, a set of ribbons sandwiched between the plates at the front end of the outlet to form myriad jet openings whereby a sheet of flame emerges from the outlet when the mixture is ignited, and a pad of thermal insulation secured to the outer surface of each plate to protect said set of ribbons from excessive heating that would result in a distortion of the ribbons;
B. a refractory body of a material which when heated to an elevated temperature level emits infrared radiation, said body having an internal channel therein which accommodates and thermally shields the burner, an internal cavity formed in the body in alignment with the outlet of the burner and having a surface on which the flame impinges to cause this surface to emit infrared radiation, and at least one opening in the body communicating with the cavity to define a horn from which said infrared radiation is projected toward an object to be heated by infrared energy.

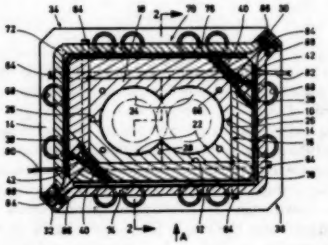
4,702,694
FURNACE WITH MODULAR CONSTRUCTION
Clyde R. Johnson, Claysville; Raymond Hawryluk, Upper St. Clair, and Gerald Katrencik, Houston, all of Pa., assignors to Union Oil Company of California, Los Angeles, Calif.
Filed Aug. 31, 1984, Ser. No. 646,353
Int. Cl.[4] F27B *9/00*
U.S. Cl. 432—133 **19 Claims**

1. A furnace comprising:
(a) a plurality of heating chamber modules connected in a vertical stack configuration, each module comprising a heating chamber and a hollow hearth which forms a substantially horizontal floor in the chamber;
(b) means for introducing material to be heated into the furnace;
(c) means for removing the material from the furnace; and



(d) means in the heating chamber periphery of each module for removing gases which form in that module during heating of the material.

4,702,695
HOUSING SECTION FOR A TWIN SCREW SHAFT MACHINE
Josef A. Blach, Wilhelmstrasse 24, 7144 Asperg, Fed. Rep. of Germany
Continuation of Ser. No. 686,318, Dec. 26, 1984, abandoned. This application Oct. 30, 1986, Ser. No. 925,504
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1983, 3347537
Int. Cl.[4] F27D *3/08*; F01C *21/10*
U.S. Cl. 432—154 **4 Claims**



1. A housing module for a twin screw shaft machine comprising an inner housing in the form of an abrasion insert and having two overlapping longitudinal bores defining a longitudinal direction and being parallel to one another; a hollow load-bearing outer housing having an interior surface of substantially rectangular cross-section surrounding exterior surface portions of said inner housing; said exterior surface portions defining a substantially rectangular outer cross-section of said inner housing; said interior and exterior surfaces engaging in closely fitting relationship; said outer housing being divided into first and second longitudinal housing sections along interfaces extending substantially parallel to said longitudinal direction and along two diagonally opposed longitudinal edges of said inner housing; clamping means for providing clamping forces tightening said first and second longitudinal housing sections of said outer housing together and against said inner housing; said clamping forces being oriented substantially transversely to said longitudinal direction and obliquely to all of said exterior surface portions of the inner housing, and a heating jacket divided into longitudinal housing sections along

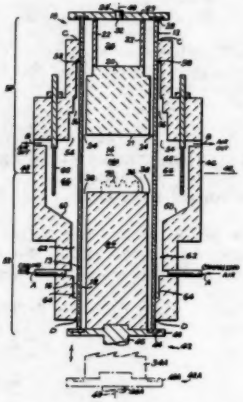
interfaces extending substantially parallel to the longitudinal direction, said heating jacket surrounding the outer housing.

4,702,696

HIGH TEMPERATURE VACUUM FURNACE

Peter Bunza, Flushing, and Alan Cross-Hansen, Uniondale, both of N.Y., assignors to Denpac Corp., Hackensack, N.J.

Filed Oct. 28, 1986, Ser. No. 923,844
Int. Cl.[4] F27B 5/04
U.S. Cl. 432—205 9 Claims



1. A vacuum tube furnace for heating dental reconstruction products using sintered powder metal, said vacuum tube having a heating chamber, opposed ends, and a length extending between said opposed ends, and sealing means for sealing said vacuum tube at said opposed ends, said sealing means having a maximum use temperature, comprising, in combination,

said tube being relatively short and made of a material being able to withstand a relatively low thermal shock resistance characteristic, the length of said tube being such that the temperature at said sealing means remains below said maximum use temperature,

insulation means positioned around and connected to said tube proximate said opposed ends, said insulation means forming a central chamber spaced from said tube in alignment with said heating chamber,

heating means positioned in said central chamber spaced around said tube, and

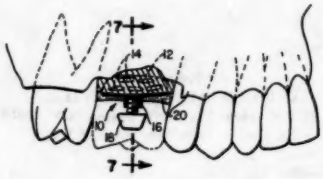
opposed annular clearance means formed between said insulation means and said tube extending to positions equally spaced from said opposed ends of said tube, each of said clearance means opening to said central chamber, said clearance means being for controlling the absorption rate by said vacuum tube of heat emanating from said heating means during the heating process so that the heat is absorbed by said tube at a gradual controlled temperature gradient along the entire length of said tube that is less than the thermal shock resistance characteristic of said tube, whereby the furnace does not subject said tube a thermal gradient of more than 350° C. per inch during heating.

4,702,697

PREFABRICATED PARTIAL SUBPERIOSTEAL IMPLANT

Leonard I. Linkow, 1530 Palisades Ave., Fort Lee, N.J. 07024

Filed Feb. 14, 1986, Ser. No. 830,514
Int. Cl.[4] A61C 8/00
U.S. Cl. 433—173 6 Claims



1. A prefabricated subperiosteal implant for supporting an artificial tooth structure, comprising:

two thin elongated plates of pliable, work-hardenable material;

short protrusions from the surface of each plate;

means for fastening said two plates together such that the two plates are aligned and the short protrusions are adjacent one another; and

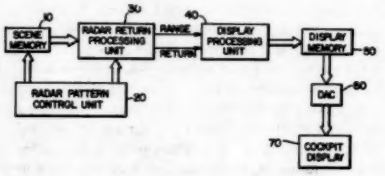
a post for supporting an artificial tooth structure, said post being adapted for attachment to said short protrusions.

4,702,698

DIGITAL RADAR GENERATOR

Paul B. Beckwith, Indialantic; Donald S. Bistarkey, Palm Bay; Joseph J. Pohedra, Melbourne Beach, and Donald E. Trimble, Melbourne, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Sep. 21, 1984, Ser. No. 652,875
Int. Cl.[4] G09B 9/00
U.S. Cl. 434—2 46 Claims



1. For use with a terrain map storage device containing a digital data base in which a terrain map in the form of data representative of at least the elevation of said terrain over a prescribed geographical area is stored, an apparatus for generating a simulated radar return image to be produced on a video display device corresponding to a radar sweep pattern directed toward said terrain from a designated radar source reference point about a preselected look angle, comprising:

memory means for storing, in addressable memory locations thereof, a portion of the digital data representative of at least the elevation of terrain over a portion of said geographical area such that, as stored in said memory means, said terrain representative data has a prescribed geographical orientation;

first means, coupled to said memory means, for controllably accessing data values stored in addressable memory locations of said memory means for a plurality of successive locations on said terrain map along each of a plurality of rays of which said radar sweep pattern is formed and radiating from said designated radar source point about the look angle of said radar sweep pattern, said look angle

having a geographical orientation which is independent of said prescribed geographical orientation, and generating therefrom first signals representative of the effective range from said designated radar source reference point to the plurality of successive locations on said terrain map for each of said rays, and second signals representive of the effective intensity of radar sweep pattern return signals reflected back from said successive locations to said radar source reference point; and

second means, coupled to said first means, for controllably energizing the pixels of a video display device in accordance with said second signals, the locations of which on said display device being selected in accordance with said first signals.

4,702,699

TARGET IMAGE PRESENTATION SYSTEM

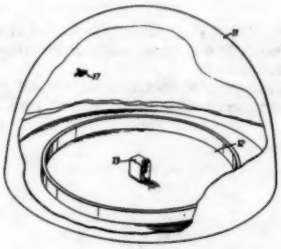
Anthony Nordberg, Sussex, England, assignor to GQ Defence Equipment Limited, Surrey, England

Filed Feb. 26, 1985, Ser. No. 705,876

Claims priority, application United Kingdom, Mar. 2, 1984, 8405519

Int. Cl.[4] F41J 5/10

U.S. Cl. 434—20 **5 Claims**



1. A target image presentation system for displaying images of a target on the interior surface of a part-spherical dome to provide to an observer at a predetermined position within the dome a visual representation of an aerial target flying a predetermined flight profile within an airspace surrounding the observer, the system including:

means for providing images of the aerial target in a sequence of changing target orientations corresponding to the predetermined flight profile as viewed from the position of said observer inside the dome;

means for projecting in a fixed direction a light beam carrying said images, said beam having an axis;

means located in the path of the beam between the projecting means and the interior surface of the dome for deflecting the image-carrying light beam to direct the target images carried thereby to successive positions on the dome corresponding to positions of the aerial target flying the predetermined flight profile in the airspace represented by the dome, said deflecting means inherently causing a rotation of the images about the beam axis as a function of the amount of beam deflection, wherein the improvement comprises:

said target image providing means including means for generating target images that are pre-oriented in such a manner as to compensate for subsequent image rotation about the beam axis by the image beam deflection means, such that the images when projected onto the dome via said image beam deflection means have line of sight orientations corresponding to those which would be viewed from the position of said observer during the flight of an actual target following the predetermined flight profile.

4,702,700

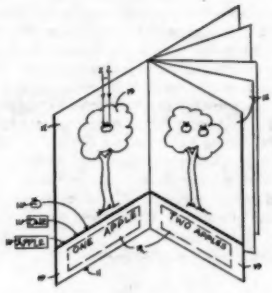
ACTIVITY BOOK WITH REMOVABLE MANIPULATIVES

Cheryl J. Taylor, 520 Chapel Rd., Amelia, Ohio 45102

Filed Dec. 29, 1986, Ser. No. 946,596

Int. Cl.[4] G09B 1/08

U.S. Cl. 434—168 **7 Claims**



1. An activity book with multi educational features for self-learning and directed learning by children comprises a set of bound pages, a plurality of which are characterized by (a) having a visual object thereon with at least one magnetic means mounted within the outline of the visual object, (b) a pocket as an integral part of the page, (c) removable manipulatives capable of being stored within said pocket and having magnetic means for removably attaching to other magnetic means, and (d) additional magnetic means positioned on the pocket of sufficient size that at least two of the manipulatives can be placed thereon and securely held.

4,702,701

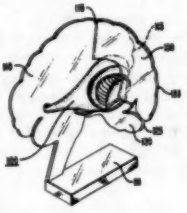
MULTIPLE SUBSTRUCTURE ANATOMICAL ORGAN MODEL

Roy A. Glover, 2617 Esch St., Ann Arbor, Mich. 48104; Peter Coyle, 2790 Danbury La., Ann Arbor, Mich. 48103, and Denis C. Lee, 1120 Heather Way, Ann Arbor, Mich. 48104

Filed Apr. 9, 1984, Ser. No. 598,514

Int. Cl.[4] G09B 23/30

U.S. Cl. 434—270 **13 Claims**



1. A modeling arrangement for facilitating the study of an anatomical organ of a living being by a student, the anatomical organ having a plurality of internal organ structures and corresponding spaces between said internal organ structures, the spaces being of the type which are normally occupied with gas and fluid, the modeling arrangement comprising:

a plurality of individual and separable substructure models corresponding to predetermined respective ones of the plurality of internal organ structures, said substructure models being removably arranged with respect to one another in accordance with the corresponding internal organ structures of the anatomical organ;

at least one nonorgan space model formed substantially as one of said substructure models, but corresponding to a selected one of the corresponding spaces which are normally occupied with at least one of the gas and fluid, in the vicinity of said substructure models, said space model being removably arranged in adjacency with neighboring one of said substructure models and in accordance with the selected corresponding space of the anatomical organ; and

a carrier member for supporting said substructure models and said space model in said accordance with the internal organ structures and spaces of the anatomical organ, said carrier member being formed at least partially as a sheet of transparent material having substantially planar sides and an outer edge substantially transverse to said substantially planar sides, said outer edge being contoured to conform to a corresponding outer surface portion of the modeled anatomical organ whereby said substructure models and said space model are directly accessible by the student while said carrier member is in an anatomically correct location and orientation with respect to said substructure and space models.

4,702,702

THREE-DIMENSIONAL MODEL OF MOLECULAR STRUCTURE AND A DEVICE FOR DISASSEMBLY AND REASSEMBLY OF SAME

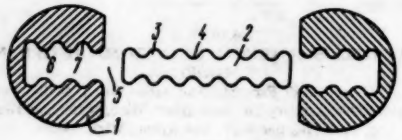
Raik-Khiio N. Mikelsaar, ulitsa Yakobsona, 11, kv. 4, Tartu, U.S.S.R.

Continuation of Ser. No. 625,827, Jul. 25, 1984, abandoned. This application Jun. 4, 1986, Ser. No. 847,435

Claims priority, application PCT Int'l Appl., Dec. 24, 1982, PCT/SU82/00035

Int. Cl.[4] G09B *23/26*

U.S. Cl. 434—278 **3 Claims**



1. A three-dimensional model of molecular structure, comprising plastic modules each of which representing one atom of the molecular structing being simulated and which are interlinked through connecting elements fitted in sockets of each module, said sockets being shaped so as to suit the shape of the connecting element, wherein the improvement comprises each connecting element including a cylindrical rod made of a compact plastic whose entire surface, as well as the mating surface of the sockets of each module, is provided with easily curved projections alternating with depressions of the same shape to establish a ridge-and-recess joint and adjoin the modules to each other when the connecting element is fitted in the socket.

4,702,703

DEVICES FOR AIDING ASTRONOMERS TO LOCATE STARS AND OTHER CELESTIAL BODIES

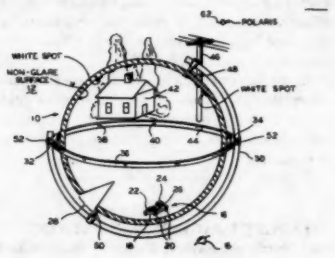
Robert R. Herbst, 17649 Adena La., San Diego, Calif. 92128

Filed Dec. 24, 1985, Ser. No. 812,966

Int. Cl.[4] G09B *27/06*

U.S. Cl. 434—289 **10 Claims**

1. A hollow transparent sphere, having spots dispersed over the surface of the sphere, said spots being arranged on said surface to depict stars and constellations at the positions which they actually occupy in the sky; means inside said sphere for illuminating the surface of the sphere, said illuminating means being a removable, battery powered light source having supporting rollers so that said illuminating means rolls under gravity to the lowest point on the sphere, said spots reflecting the light of said illuminating means; and a ring encircling at least part of the circumference of the sphere, said ring being



secured to the sphere at its north and south poles and a band perpendicular to the ring and encircling the sphere at a location corresponding to the earth's equator to provide a surface which may be marked with orienting indicia.

4,702,704

TETRAHEDRAL CODON STEREO-TABLE

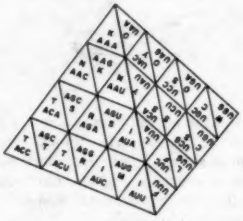
Manabu Fujimoto, Kyoto, Japan, assignor to Shionogi & Co., Ltd., Osaka, Japan

Filed Sep. 16, 1985, Ser. No. 776,693

Claims priority, application Japan, Sep. 19, 1984, 59-197537

Int. Cl.[4] G09B *23/00*

U.S. Cl. 434—295 **14 Claims**



1. A three-dimensional tetrahedral stereo-table arranged for 64 DNA and/or RNA codons, which comprises a three-dimensional tetrahedron having 4 faces, each face divided by indicia into 16 codon phases, pointing out all codon triplets and corresponding 21 teams representing 20 L-amino acids and one triphasic termination team.

4,702,705

STEERING WHEEL

Atsuo Hirano; Tetsushi Hiramitsu, and Satoshi Ohno, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Aug. 28, 1986, Ser. No. 901,393

Claims priority, application Japan, Aug. 28, 1985, 60-190346; Aug. 30, 1985, 60-192564

Int. Cl.[4] H01R *39/08, 39/22*

U.S. Cl. 439—15 **6 Claims**

1. A steering wheel comprising:

a pad portion;

a column portion;

a pad side unrotatable member;

at least one pad side slip ring disposed below said pad side unrotatable member;

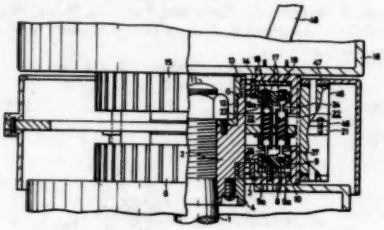
a column side unrotatable member;

at least one column side slip ring disposed above said column side unrotatable member;

a boss plate positioned between said pad side and column side unrotatable members;

at least one cylindrical contact pin holder fixedly secured to said boss plate;

a pad side contact pin in sliding contact with said pad side slip ring, said pad side contact pin being slidingly supported in said contact pin holder;



a column side contact pin in sliding contact with said column side slip ring, said column side contact pin being slidingly supported in said contact pin holder;

a spring disposed in said contact pin holder and interposed between said pad and column side contact pins, and aligned linearly therewith; and

a lubricant filled in said contact pin holder.

4,702,706

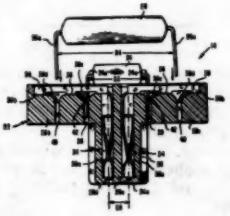
ELECTRICAL CONNECTING DEVICE INCLUDING SOCKET THEREFOR

Amir-Akbar Sadigh-Behzadi, Van Nuys, Calif., assignor to Thomas & Betts Corporation, Raritan, N.J.

Continuation of Ser. No. 523,802, Aug. 16, 1983, abandoned. This application Mar. 17, 1986, Ser. No. 840,279

Int. Cl.[4] H01R *23/02*

U.S. Cl. 439—69 **7 Claims**



1. An electrical socket for disengageable connection to conductors of an electric component comprising:

an elongate insulative housing for receiving an electric package having a plurality of conductive leads extending therefrom, said housing including a central portion having a plurality of apertures extending in spaced disposition longitudinally along the housing central portion, said housing including a lateral portion extending along said housing, two rows of openings extending longitudinally in said lateral portion, said rows of openings being laterally spaced from each other, said lateral portion having a plurality of laterally extending, longitudinally spaced recesses, each recess communicating with one opening of each row; and

a plurality of conductive electrical contacts supported on said housing, each contact including a first end portion disposed in a respective one of said apertures for disengageable electrical engagement with a conductor of said electrical component and a second end portion having a projecting extent, each projecting extent lying in a respective recess in said housing lateral portion, there being on each projecting extent a pair of contact members in registry with a pair of said openings, one from each row, in said lateral portion, said contact members adapted for selective engagement with said leads of said electric package, said projecting extent of each contact second end portion comprising a generally flat surface, and said contact members each comprising a spring member biased to urge against a lead of said electric package, said spring members having been formed from said generally flat surface and being cantilevered and curved and projecting into respective ones of said openings of said housing, the unsupported distal ends of said spring members cooperating with an opposed spaced wall portion of the housing defining each opening to provide a resiliently expandable opening for receipt of one of said leads of the electric package therein.

4,702,707

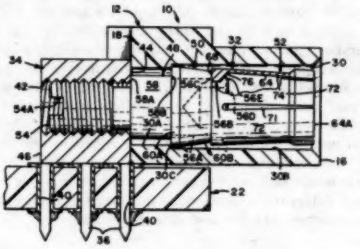
POWER CONTACT HAVING REMOVABLE MATING COMPONENTS

Warren C. Hillbish, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 15, 1986, Ser. No. 897,188

Int. Cl.[4] H01R *9/09*

U.S. Cl. 439—80 **2 Claims**



1. A power contact for use with connectors mounted on printed circuit boards, comprising:

conductive base means having a threaded bore extending therethrough and opening onto opposing surfaces and further having terminal means extending outwardly therefrom for being electrically attached to circuits on the printed circuit board, said base means being adapted to be positioned adjacent to a connector having a passage therethrough with said threaded bore being coaxial with said passage; and

a conductive mating component including elongated stem means with mating means at one end adapted to be disposed in said passage in said connector and a threaded portion at another end with tool receiving means at the free face thereof, said threaded portion being received through one opening in said threaded bore in said base means with said tool receiving means being accessible through the other opening for receiving a tool for unthreading said mating component from said threaded bore to enable removing and replacing the mating component without moving said base means or connector adjacent to which said base means may be positioned.

4,702,708

PLUG-TYPE CONNECTOR MODULE CARRYING A PRINTED CIRCUIT BOARD

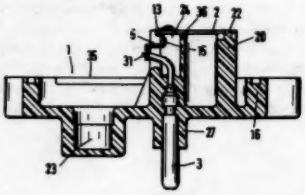
Oswald Reuss, Unterelsbach, and Karl L. Otto, Bad Neustadt-/Saale, both of Fed. Rep. of Germany, assignors to Preh, Elektrofeinmechanische Werke, Jakob Preh, Nachf, GmbH & Co., Bad Neustadt/Saale, Fed. Rep. of Germany

Filed Jul. 18, 1985, Ser. No. 756,863

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1984, 3426411; Jul. 28, 1984, 3428006

Int. Cl.[4] H01R 9/09

U.S. Cl. 439—83 6 Claims



1. Plug-type connector module apparatus with an insulating carrier body, a printed circuit board having at least one edge contact surface carried by said carrier body, the apparatus having at least one plug connection part for connecting to said printed circuit board, said plug connection part consisting of a front plug member with a portion thereof embedded in said carrier body, and of at least one contact member having an arc-shaped deformation; all of said at least one contact member being made from a single strip-shaped band of spring material and each of said at least one contact member having a free end having an approximately bell-shaped clamp plugged into said edge contact surface of said printed circuit board by clamp fit, each said fit solderable with soldering bath and and end part with a perforation in it, said perforation receiving said front plug member and said end part forming a solderable contact point for said plug member; characterized in that said carrier body comprises a base with a first, flat surface and with a carrier part rising from said first surface, said carrier part having a flat second surface which is parallel to said first surface, said printed circuit board being attached to said second surface with adhesive, said second surface having molded elevations under said printed circuit board, which said elevations have different pre-determined heights as a function of the distance between said first and second surfaces.

4,702,709

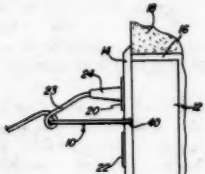
COVER PLATE PLUG RETAINER

Michael A. Santilli, 3528 Cotillion, Plano, Tex. 75074

Filed Jun. 3, 1986, Ser. No. 870,006

Int. Cl.[4] H01R 13/447, 13/58

U.S. Cl. 439—144 20 Claims



1. A plug retainer for wall mounted electrical outlets having receptacles and a cover plate engaging a peripheral wall portion of a wall panel, said plug retainer comprising:

a retaining bracket comprising a retaining bar having two ends, each of which is attached to a first end of one of a pair of substantially parallel legs, said legs also having a free end and

means for pivotably securing the free end of each leg so that the retaining bracket pivots with respect to said cover plate.

4,702,710

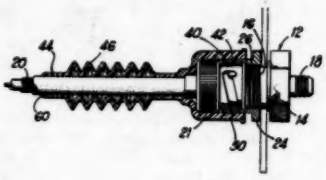
WATERPROOF SEAL ASSEMBLY FOR ELECTRICAL CONNECTOR

William J. Dittman, Marietta, and Luther S. Ward, Winston, both of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jun. 20, 1986, Ser. No. 876,396

Int. Cl.[4] H01R 13/52

U.S. Cl. 439—271 19 Claims



1. A waterproof seal assembly for an electrical connector disposed on a cable comprising a threaded receiving jack designed for insertion through an aperture in a wall member with the threaded portion projecting through said aperture, an elastomeric sleeve means having a passageway therethrough for encompassing the cable means and the electrical connector, elongated securing means having threads formed therein for mating with said threaded portion of said receiving jack and securing said jack in said aperture, said securing means extending axially from the receiving jack and having sufficient diameter to encompass a portion of the electrical connector and to be received within said sleeve means, and a sealing means disposed at the interface of said sleeve means and said securing means.

4,702,711

SNAP-ACTION BAYONET-TYPE FASTENING DEVICE FOR CONTROL AND/OR SIGNALLING UNITS

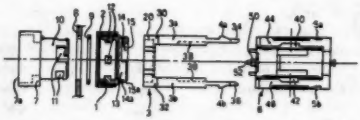
Fiorino Falchi, Sangano, Italy, assignor to General Electric Company, Charlottesville, Va.

Filed Apr. 25, 1986, Ser. No. 855,948

Claims priority, application Italy, Apr. 24, 1985, 21636/85[U]

Int. Cl.[4] H01R 13/74

U.S. Cl. 439—546 4 Claims



1. Snap-action bayonet-type fastening device for control and/or signalling units comprising a sleeve of a form corresponding to and designed to interact with a rear projecting portion of an operative unit which has shaped surface cuts, said sleeve having a form complementary to that of said rear portion of the operative unit inserted like a bayonet in said sleeve, the internal surface of said sleeve being provided with protrusions forming part of said bayonet coupling, the external surface of said sleeve being partially threaded; a ring-nut screwed onto the external surface of said sleeve; and means of fastening

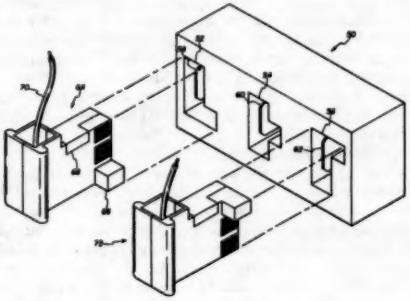
receptacles or electrical units of the control and/or signalling unit to said sleeve characterized in that said fastening means consist of an annular element positioned between said sleeve and said receptacles or electrical units, having the form of a ferrule comprising an annular cornice with protuberances turned inward and designed to engage with appropriate corresponding fixing means present on said sleeve and two or more flexible appendices having means designed for engaging with corresponding means in said receptacles or electrical units.

4,702,712

KEYED INSULATOR APPARATUS

Ali Ghorbani, and Gary M. Walker, both of Richardson, Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 24, 1986, Ser. No. 922,649
Int. Cl.[4] H01R *13/40*
U.S. Cl. 439—596 **3 Claims**



1. Unitary keyed electrical terminal insulator apparatus comprising, in combination:

top portion means including first and second surfaces where said first surface includes cavities for accommodating at least one quick disconnect electrical terminal means having an electrical wire portion and a quick disconnect mating portion;

bottom portion means including first and second surfaces where said first surfaces includes cavities for accommodating said at least one quick disconnect electrical terminal means;

flexible hinge means interconnecting said top and bottom portions whereby said top and bottom portions may be side by side in manufacture with said hinge means being bowed;

latch means on an edge of one of said top and bottom portions;

catch means on an edge of the other of said top and bottom portions for coacting with said latch means;

a plurality of removable projecting keying means extending from said second surface of at least one of said top and bottom portions as manufactured and at least one of said removable projecting keying means being removed for each of several keyed configurations, and

said top portion means, bottom portion means, latch means, catch means, hinge means and keying means all comprising a unitary structure of one material.

4,702,713

ELECTRIC TROLLING MOTOR FOOT CONTROL MOUNT

Bruce R. Lee, Rte. 8, Box 101, Fredericksburg, Va. 22401

Filed Apr. 23, 1985, Ser. No. 726,342
Int. Cl.[4] B60L *15/20*
U.S. Cl. 440—7 **6 Claims**

1. A mount for an electric trolling motor foot control unit comprising a substantially planar base plate, control means for steering and motor operation functions comprising a foot pedal mounted for pivotal movement about a horizontal axis mounted on said base plate, means for fastening one end of said base plate to the floor of a boat for movement with respect to

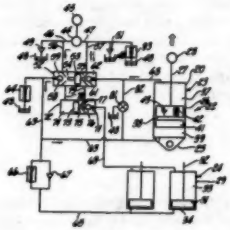
the floor while the other end of said base plate slides on the floor, said fastening means including means limiting the movement of said control unit along a predetermined path, said fastening means comprising an aperture formed in said one end of said planar base plate, and pivot means passing through said aperture.

4,702,714

TILT MECHANISM FOR MARINE PROPULSION DEVICE

Ryoichi Nakase, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Japan

Filed Dec. 18, 1985, Ser. No. 811,314
Claims priority, application Japan, Mar. 19, 1983, 58-45321
Int. Cl.[4] B63H *5/12*
U.S. Cl. 440—61 **9 Claims**



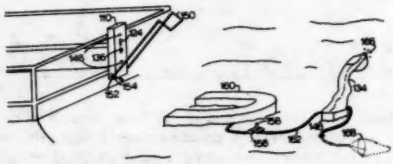
1. A tilt mechanism for a marine outboard drive comprising an outboard drive unit adapted to be supported for pivotal movement relative to an associated hull about a generally horizontally disposed axis from a normal running position to a tilted up out of the water position, a hydraulically operated trim cylinder assembly operatively interposed between the hull and the outboard drive for pivoting the outboard drive relative to the hull between a normal running position and a plurality of trim positions, a hydraulically operated tilt cylinder assembly operatively interposed between the hull and the outboard drive for tilting the outboard drive from a normal running position or any of said trim adjusted positions to a tilted up position, and hydraulic control means for controlling the operation of said trim cylinder assembly and said tilt cylinder assembly for controlling the position of the outboard drive unit relative to the hull, the improvement comprising said hydraulic control means including means for pressurizing said tilt cylinder assembly independently of said trim cylinder assembly for tilting up of said outboard drive without initial actuation of said trim cylinder assembly in response to the sensing of a pressurizing force in said control means less than the amount of pressurizing force required to effect trimming up of said outboard drive unit by said trim cylinder assembly.

4,702,715

AUTOMATIC EMERGENCY RESCUE APPARATUS

Alan L. Winick, 4 Oak Ridge Park, Westport, Conn. 06880

Filed Jun. 6, 1986, Ser. No. 871,251
Int. Cl.[4] B63C 9/00
U.S. Cl. 441—80 13 Claims



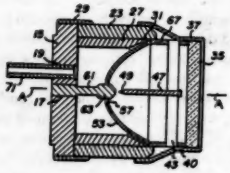
1. An automatic apparatus for launching rescue equipment in response to an emergency condition, said automatic apparatus comprising a launcher housing, a launcher arm rotatably mounted on said launcher housing, first spring means for urging said launcher arm to rotate relative to said launcher housing, an actuation means displaceably mounted in said launcher housing and having a first latching means provided thereon, a trigger means adapted to engage said first latching means when said actuation means and said trigger means are in respective first positions, a second spring means for urging said actuation means toward a second position in response to said trigger means being displaced to a second position whereat said trigger means is disengaged from said first latching means, a marker buoy housing capable of being releasably mounted on said launcher housing, and coupling means connected to said launcher housing for releasably coupling said launcher housing and said marker buoy housing, said coupling means comprising second latching means displaceable between a first position at which said second latching means couples said launcher housing and said marker buoy housing and counteracts the urging of said launcher arm and a second position at which said second latching means releases said marker buoy housing from said launcher housing and does not counteract the urging of said launcher arm, said second latching means being displaced from its first position toward its second position by said actuation means when said actuation means reaches it second position.

4,702,716

METHOD FOR ASSEMBLING ARC LAMP

Roy D. Roberts, Newark, Calif., assignor to ILC Technology, Inc., Sunnyvale, Calif.

Division of Ser. No. 735,817, May 17, 1985. This application Jan. 7, 1987, Ser. No. 1,183
Int. Cl.[4] H01J 5/16
U.S. Cl. 445—26 1 Claim



1. A process for assembling a lamp of the short arc type comprising the steps of:

(a) positioning a circular window within a window section of an open-ended tubular cowling member having a window section with an inside diameter approximately equal to the outside diameter of said circular window to receive said window and flaring radially outward to a body section;

(b) positioning a first end of a first hollow cylindrical body member within said body section, with the inside diameter surface of said body section abutting the outside diameter surface of said first body member;

(c) positioning a window retaining ring, having a diameter approximately equal to that of said circular window, concentrically within said window section of the cowling member with a first edge of said window retaining ring abutting said window to sealingly secure said circular window in place;

(d) positioning a strut means against a second edge of said window retaining ring with said strut means extending radially inward from the window retaining ring and with said strut means positioned between the window and body sections of said cowling member;

(e) positioning a cathode member on said strut means to extend axially from said strut means in a direction opposite said circular window;

(f) brazing together, in a single braze step, said window, said cowling member, said window retaining ring, said strut means, said cathode member, and said first body member;

(g) inserting within said first body member a reflecting shell retaining ring having an outside diameter approximately equal to the inside diameter of said first cylindrical body member, said reflecting shell retaining member having a first edge abutting said strut means and being mounted partially within said first cylindrical body member at the first end thereof;

(h) inserting inside the first body member a hollow concave reflecting shell having a mouth and dimension to fit completely within said first cylindrical body member with the outer edge of said concave member positioned against a second edge of said reflecting shell retaining ring, and with an aperture formed therethrough opposite its mouth;

(i) inserting inside the first cylindrical body member a second hollow cylindrical body member having a length less than the first body member, and positioned to fit flush concentrically within the first body member, the second body member having a radially tapered edge at a first end abutting the periphery of the outer walls of said concave shell to secure the reflecting shell concentrically in place between said reflecting shell retaining ring and said second body member;

(j) attaching an anode member on a disk shaped base dimensioned to sealingly enclose a second end of said first body member and a second end of said second body member, and with said anode member dimensioned and positioned to extend axially through said central aperture in said hollow concave reflecting shell to a location spaced adjacent the end of said cathode member at the focal point of said reflecting shell; and

(k) sealingly attaching said disk member to the second end of the first body member and the second end of the second body member.

4,702,717

METHOD OF MAKING ELECTRIC LAMP WITH INTERNAL CONDUCTIVE REFLECTOR

Merle E. Morris, and Stephen P. Senft, both of Lexington, Ky., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jan. 30, 1987, Ser. No. 9,303
Int. Cl.[4] H01J 9/00, 9/26
U.S. Cl. 445—27 11 Claims

1. A method of making an electric lamp comprising:

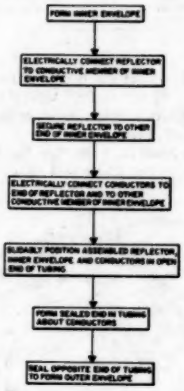
forming an inner light-transmitting envelope having a filament therein and a pair of electrically conductive members projecting therefrom and electrically connected to said filament;

electrically connecting an electrically conductive reflector at one end thereof to one of said electrically conductive members projecting from said inner envelope;

securing said reflector at another end thereof to said inner envelope at a location distant from said electrical connection between said reflector and conductive member such

that said reflector is positioned adjacent said inner envelope;

electrically connecting a first electrical conductor to the other of said electrically conductive members projecting from said envelope and a second electrical conductor to said section of said reflector secured to said end of said inner envelope;


FORM INNER ENVELOPE
ELECTRICALLY CONNECT REFLECTOR TO CONDUCTIVE MEMBER OF INNER ENVELOPE
SECURE REFLECTOR TO OTHER END OF INNER ENVELOPE
ELECTRICALLY CONNECT CONDUCTORS TO END OF REFLECTOR AND TO OTHER CONDUCTIVE MEMBER OF INNER ENVELOPE
SLIDABLY POSITION ASSEMBLED REFLECTOR, INNER ENVELOPE AND CONDUCTORS IN OPEN END OF TUBING
FORM SEALED END IN TUBING ABOUT CONDUCTORS
SEAL OPPOSITE END OF TUBING TO FORM OUTER ENVELOPE

slidably positioning said inner envelope, reflector and conductor assembly within an open end of a piece of light-transmitting tubing such that said conductors are aligned with a predetermined portion thereof;

forming a sealed end about said conductors at said predetermined portion of said tubing such that parts of said conductors project externally of said sealed end; and

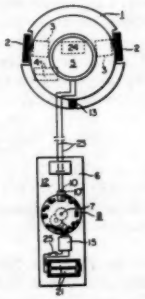
sealing the opposing end of said tubing to define an outer envelope.

4,702,718

CONTROLLED-DRIVE TOY

Tsunao Yanase, Fukuoka, Japan, assignor to Kaho Musen Limited, Japan

Filed Feb. 5, 1986, Ser. No. 827,101
Int. Cl.[4] A63H *17/395*
U.S. Cl. 446—175 **2 Claims**



1. A controlled-drive toy comprising:

a body member providing a rotary shaft,

batteries carried on said body member,

a motor energized by said batteries for rotating said rotary shaft,

a pair of driving wheels mounted on said body member independently driven by respective driving motors to move the toy,

a rotary disc mounted to said rotary shaft and having a respective peripheral ring of light and dark data segments for each drive motor representing, by the relative location and duration of the light and dark segments, duration of rotation and non-rotation of each drive motor to produce, by the combined rotation and non-rotation of the drive motors for durations determined by data segments of the respective rings, a moving pattern for the toy, and

sensor means mounted on said body member and including a pair of photosensors for sensing said data segments on said rings, respectively, and

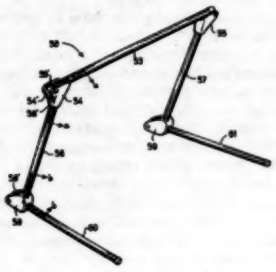
control means responsive to said sensor means for producing control signals to energize said driving motors from said batteries to move said toy in the moving pattern depending on the location and duration of said light and dark segments of the data segments.

4,702,719

DEVICE FOR SUSPENDING INFANT TOYS

Aharon M. Lapid, Shimshon, Israel, assignor to Tzora Furniture Industries Ltd., Bet Shemesh, Israel

Filed Oct. 4, 1985, Ser. No. 784,195
Claims priority, application Israel, Oct. 26, 1984, 73327
Int. Cl.[4] A63H *33/00*; **E05D** *11/06*; **A47D** *15/00*
U.S. Cl. 446—227 **7 Claims**



1. An infant's amusement device, comprising:

a suspension bar having a longitudinal axis;

a pair of juncture bars pivotably mounted at one of their ends to the opposite ends of said supporting bar by a first pair of hinges;

and a pair of supporting bars pivotably mounted to the opposite ends of said juncture bars by a second pair of hinges, such that all said bars are foldable to an approximately parallel relationship for storage or transportation, but may be erected to an operative relationship wherein the supporting bars are disposed in a common plane for resting on a horizontal surface, and the suspension bar is disposed in a horizontal position overlying the horizontal surface;

said first pair of hinges including surfaces permitting pivotable movement of the juncture bars only along axes perpendicular to the longitudinal axis of the suspension bar;

said second pair of hinges including surfaces limiting the pivoted position of the juncture bars such that the suspension bar overlies an intermediate portion of the supporting bars, and permitting pivotable movement of the juncture bars with respect to the supporting bars only about axes parallel to the longitudinal axis of the suspension bar, thereby to brace the suspension bar against displacement parallel to its longitudinal axis.

4,702,720

TRICK VEHICLE CAPABLE OF JUMPING

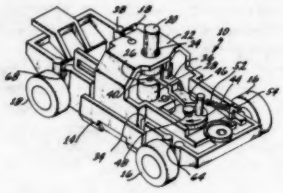
Yukio Konta, and Yosuke Yoneda, both of Tokyo, Japan, assignors to Tomy Kogyo Co. Inc., Tokyo, Japan

Continuation of Ser. No. 602,610, Apr. 20, 1986. This application Feb. 4, 1986, Ser. No. 825,853

Claims priority, application Japan, Aug. 2, 1983, 58-119870[U]

Int. Cl.[4] A63H *17/26*

U.S. Cl. 446—448 12 Claims



1. A toy vehicle which comprises:

a vehicle chassis;

a plurality of wheels mounted on said chassis in positions to contact a support surface, said vehicle moving on said support surface by rolling on said wheels;

an axle, at least one of said wheels attaching to said axle, said axle being rotatively mounted on said chassis for rotation on said chassis, said axle rotated on said chassis in response to rotation on said support surface of said one of said wheels attached to said axle;

a chassis extension fixedly attaching to said vehicle chassis and stationary with respect to said vehicle chassis, said chassis extension including an elevated portion located in an elevated position above said chassis;

an inertial element movably located on said chassis below said elevated portion of said chassis extension, said element vertically movable on said chassis between a locked position and a position wherein said element contacts said elevated portion of said chassis extension;

force means located on said chassis in operative association with said element, said force means for accelerating said element upwardly from said locked position towards said elevated portion of said chassis extension whereby said element contacts said elevated portion of said chassis extension and transfers the force of said acceleration to said chassis to move said chassis with respect to said support surface;

a retaining member movably located on said chassis in operative association with said element so as to move with respect to said element between a position where said retaining member holds said element in said locked position and a position wherein said retaining member releases from said element allowing said element to be moved from said locked position by said force means;

a rotating member movably mounted on said chassis, said rotating member vertically movable on said chassis between an elevated position and a depressed position;

biasing means located on said chassis in operative association with said rotating member;

said rotating member in operative association with said element whereby said element operatively contacts said rotating member and holds said rotating member in its depressed position when said element is in its locked position and said element releases from said rotating member when said element moves towards its elevated position and in response to said element releasing from said rotating member said biasing means moving said rotating member to its elevated position;

said rotating member further in operative association with said retaining member so as to move said retaining member;

rotation transfer means for transfering rotation, said rotation transfer means operatively associated with both said axle and said rotating member so as to transfer rotation of said axle to said rotating member when said rotating member is in its depressed position, whereby

in response to rotation of said axle, said rotation transfer means rotating said rotating member, said rotation moving said retaining member with respect to said element releasing said retaining member from said element such that said element moves from said locked position towards said elevated portion of said chassis extension.

4,702,721

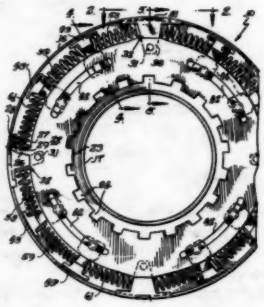
LONG TRAVEL DAMPER WITH LOW LAG DYNAMIC SPRING RETAINERS

Paul E. Lamarche, Utica, Mich., assignor to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Mar. 18, 1986, Ser. No. 841,122

Int. Cl.[4] F16D *3/14*

U.S. Cl. 464—67 13 Claims



1. A vibration damper assembly to transmit torque between driving and driven members, comprising a piston plate adapted to engage torque input means and having an outer flange, a hub plate operatively connected to torque output means and having a plurality of circumferentially spaced, radially extending integral hub arms, a plurality of torque input members corresponding in number to and generally axially aligned with said hub arms secured to said piston plate, each torque input member including a pair of generally parallel arms joined by a U-shaped base forming a channel to receive a hub arm therein, said U-shaped base having a central notch defining separated body portions and said piston plate outer flange having a pair of spaced notches receiving the separated body portions of the base and a central tab received in said central notch, a plurality of damper spring sets interposed between adjacent torque input members, and spring separators interposed between adjacent damper springs in a spring set and guided on said hub plate for arcuate movement relative to said hub plate and piston plate.

4,702,722

UNIVERSAL JOINT YOKE

Atsushi Narue; Shigeru Saitoh, and Tomoyuki Maruyama, all of Kosai, Japan, assignors to Fuji Kiko Company, Limited, Tokyo, Japan

Filed Feb. 18, 1986, Ser. No. 830,274

Claims priority, application Japan, Feb. 25, 1985, 60-34517; Feb. 25, 1985, 60-34518; Jul. 22, 1985, 60-111040[U]

Int. Cl.[4] F16D *3/26*

U.S. Cl. 464—93 11 Claims

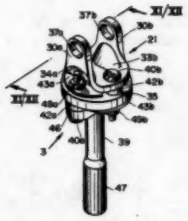
1. A universal joint, comprising:

(a) a bent sheet metal blank, the blank before being bent having a generally cruciate form which has two semielliptical portions and a central circular portion,

the bent sheet metal blank including;

(b) a pair of ear portions which are respectively constituted by the semielliptical portions, are folded within the central circular portion and have two bores provided for mounting trunnions constituting a universal joint cross member;

(c) a base portion defined by the central circular portion of the sheet metal blank and interconnecting the pair of ear portions, the base portion having two mutually spaced bores through which the bent sheet metal blank is fastened to means for elastically coupling the bent sheet metal



blank to a shaft of a steering system by fastening means, the elastic coupling means having a substantially circular form which has generally the same diameter as that of the central circular portion; and

(d) at least two rib portions projecting toward an inner space between the pair of ear portions and formed along a part of each major axis of the semielliptical portions including the base portion so as to extend over one of the pair of ear portions and the other of the pair of ear portions.

4,702,723

HOMOKINETIC JOINT HAVING PIVOTABLE JAWS WITH COMPLEMENTARY SETS OF TEETH FOR CONJUGATE PIVOTAL MOVEMENT THEREOF

Michel A. Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

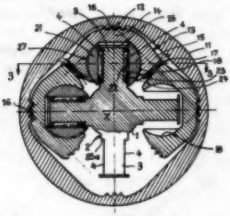
Filed Apr. 22, 1986, Ser. No. 854,748

Claims priority, application France, Apr. 25, 1985, 85 06347

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.[4] F16D *3/20*

U.S. Cl. 464—120 **8 Claims**



1. A homokinetic transmission joint, comprising a first joint element having a first axis and including four pairs of raceways evenly spaced apart around the first axis, the raceways of each pair being parallel to each other and to said first axis, a second element having a second axis capable of intersecting or being in alignment with the first axis, the second element including spherical bearing surfaces evenly spaced apart about the second axis, each of the spherical bearing surfaces confronting at least one raceway of a respective pair of raceways, an intermediate member disposed between each of the raceways and a respective one of the spherical bearing surfaces, rolling members interposed between the intermediate members and the raceways, wherein each pair of raceways are formed in a first part and at least one respective spherical bearing surface is formed in a second part which together with the first part comprises a pair of parts, one of the parts of each pair being mounted on the element with which it is associated in such manner to be pivotable about an axis which is parallel to the axis of said associated element and which is radially offset relative to the center of the corresponding spherical bearing surface, each pivotable part comprising sets of teeth engaged with complementary sets of teeth of adjacent pivotable parts, said sets of teeth being adapted to permit the movements of the pivotable parts relative to the associated element.

4,702,724

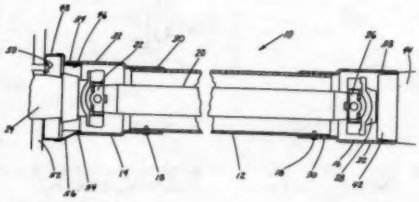
DRIVE SHAFT SHIELD ASSEMBLY

George R. Vater, Clarendon Hills, Ill., assignor to J. I. Case Company, Racine, Wis.

Filed Jun. 30, 1986, Ser. No. 880,200

Int. Cl.[4] F16C *1/26*

U.S. Cl. 464—172 **17 Claims**



1. In a shield for a work vehicle drive shaft of the type shielding the full length of the drive shaft, the improvment comprising:

a plurality of telescoping tubular members forming a continuous tube extending from a first opening at one end of the drive shaft to a second opening at the other end of the drive shaft;

means at the first and second openings to variably slidably secure the continuous tube to the work vehicle to accommodate dimensional variation between the points of attachment to the work vehicle during operation thereof; and

means to lock the tubular members into fixed relative axial positions, said locking means comprising alignable holes in each member of at least one pair of adjacent telescoping members and removable pin means inter connecting said holes,

whereby the shield may be substantially shortened to expose the ends and facilitate drive shaft and/or shield removal.

4,702,725

HYDRAULIC CONTROL SYSTEM FOR CONTINUOUSLY VARIABLE TRANSMISSION

Katsumi Kouno, Susono, and Daisaku Sawada, Gotenba, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Mar. 24, 1986, Ser. No. 843,237

Claims priority, application Japan, Mar. 26, 1985, 60-62871

Int. Cl.[4] F16H *11/06*

U.S. Cl. 474—28 **6 Claims**

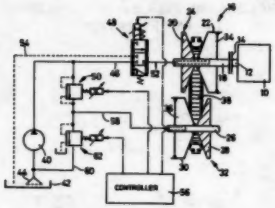
1. A hydraulic control system for a continuously variable transmission which has a variable diameter input pulley and a variable diameter output pulley provided on an input and an output shaft, respectively, with a transmission belt connecting the input and output pulleys allowing transmission of power from the input pulley to the output pulley; a pair of hydraulic cylinders for changing the effective diameters of the pulleys engaging the belt; a hydraulic source to supply a pressurized fluid to one and the other of the hydraulic cylinders via a first and a second pressure line, respectively, said hydraulic control system comprising:

a first pressure regulating device, connected to said first pressure line, for regulating said first line pressure to be applied to said one hydraulic cylinder, and thereby controlling a tension of said transmission belt;

a flow control device, disposed in said second pressure line, for controlling a flow of pressurized fluid from said second pressure line into said other hydraulic cylinder and a flow of the fluid to be discharged from said other hydraulic cylinder, thereby controlling a speed ratio of said transmission such that said speed ratio is reduced by discharging the fluid from said other hydraulic cylinder;

a second pressure regulating device, disposed between said hydraulic source and said first pressure regulating device, for controlling a rate of relief flow of the fluid therethrough from said second pressure line toward said first pressure regulating device, thereby regulating said second line pressure which is higher than said first line pressure, such that a pressure differential between said first and second line pressures is inversely proportional to said rate of relief flow of the fluid; and

a control device for controlling said second pressure regulating device to regulate said second line pressure said control device being operable to maximize said rate of relief flow of the fluid through said second pressure regulating device, so as to zero said pressure differential to permit said second line pressure to be equal to said first line pressure while said speed ratio of said transmission is constant or reduced.



4,702,726

TENSION PROVIDING DEVICE

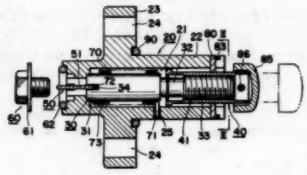
Juji Ojima, Ebina, and Isao Hino, Nagano, both of Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

Filed Apr. 21, 1986, Ser. No. 853,882

Claims priority, application Japan, Apr. 26, 1985, 60-90570

Int. Cl.[4] F16H 7/08

U.S. Cl. 474—101 **4 Claims**



1. A tension providing device which comprises: a casing forming a cave portion; a rotary shaft having a top end and a base end; a spring at a fixed position in said cave portion for rotating said rotary shaft; a pressing body having a threaded portion engaging said rotary shaft and sliding in an axial direction by rotation of the rotary shaft and being inserted into the cave portion; a bearing positioned in the cave portion of the casing and having means for supporting said threaded portion of the pressing body and the rotary shaft and restricting the rotation of the pressing body; a stopper to lock the rotation of the rotary shaft by latching it to the casing and the base end portion of the rotary shaft or to be removed for releasing the locking; and a seal member provided at the end portion of the casing after removing the stopper.

4,702,727

TENSIONING DEVICE

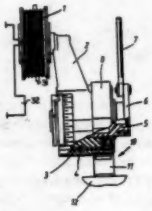
Wolfram Dahm, Nuertingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Aug. 8, 1986, Ser. No. 894,876

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1985, 3528442

Int. Cl.[4] F16H 7/08

U.S. Cl. 474—101 **14 Claims**



1. A tensioning device for a belt drive on an engine, comprising a fixed member, a rotatable member rotatable with respect to the fixed member and carrying a tensioning roller means operable to rest against a belt, spring means and damping means having a damping force dependent on the operating condition operatively connected between the fixed and the rotatable member, and additional damping means between the rotatable member and one of the fixed member and the engine, said additional damping means being controllable in dependence of at least one operating parameter and being operable to apply a damping effect throughout all ranges of tensioning activity of the tensioning roller means only at certain values of said operation parameter.

4,702,728

MACHINE TOOL SHAFT DRIVE SYSTEM

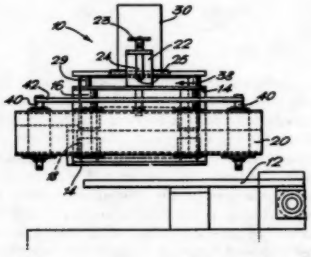
Colin W. F. Williams, Horsham, England, assignor to Systems Efficiency Limited, England

Filed Mar. 1, 1985, Ser. No. 689,008

Claims priority, application United Kingdom, Jan. 6, 1984, 8400312

Int. Cl.[4] F16H 7/02

U.S. Cl. 474—148 **11 Claims**



1. A hig speed shaft drive system useful, for example, for drilling and routing applications at speeds on the order of 24000–48000 rpm, comprising a driving pulley providing a

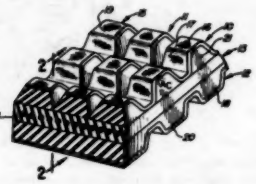
cylindrical outer surface, a driven shaft carrying a driven pulley and being axially movable with respect to the driving pulley, and a poly-vee belt drivingly coupling the driving and driven pulleys, the driven pulley being formed with an outer surface shaped to enter at least one of the grooves of the poly-vee belt.

4,702,729

TIMING BELT WITH CONTROLLED FRICTION BACKSIDE RIBS

Hiroyuki Tanaka; Eiichi Takami, both of Kobe; Kyoichi Mishima, Suzurandaihigashi; Mitsunobu Higashi, and Toshimi Kumasaki, both of Kobe, all of Japan, assignors to Mitsuboshi Belting Ltd., Nagata, Japan

Filed Feb. 7, 1986, Ser. No. 827,775
Int. Cl.[4] F16G *1/28*
U.S. Cl. 474—205 **18 Claims**



1. In a timing belt having an outer section, an inner toothed section, and an intermediate section provided with a plurality of longitudinally extending tensile cords, said outer section being provided with transversely spaced ribs extending lengthwise of said belt, each said rib having opposite sides each inclined at less than 90° to the transverse extent of the belt for engagement with a pulley, said ribs having longitudinally spaced transverse grooves defining therebetween a series of cogs, the effective coefficient of friction μ of the sides of said ribs being $\mu=0.35\times(A_g/A_c)$ where A_g= area of the portion of each side of said ribs defined by said grooves and A_c= area of each rib side defined by the cogs, the improvement comprising

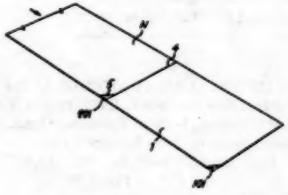
preselecting A_g and A_c to cause μ to be in the range of $0.15\times\mu\times0.90$.

4,702,730

METHOD FOR OBTAINING A WRAPPER SHEET FOR A CIGARETTE PACK

Renato Manservisi, Bologna, and Mario Fossi, Funo di Argelato, both of Italy, assignors to SASIB S.p.A., Bologna, Italy

Division of Ser. No. 281,191, Jul. 7, 1981, Pat. No. 4,541,326.
This application Mar. 8, 1985, Ser. No. 710,299
Claims priority, application Italy, Jul. 15, 1980, 15213/80[U]
Int. Cl.[4] A24F *15/00*; B31B *1/14, 3/14*
U.S. Cl. 493—56 **2 Claims**



1. A method for obtaining wrapper sheet blanks from a running, continuous web having opposite parallel edges in the running direction, wherein each blank has a first portion and a second portion, the first and second portions having a common imaginary edge, the first portion having the shape of a rectangle and the second portion having the shape of a non-rectangular parallelogram joined to the first portion along the common imaginary edge, said method comprising:

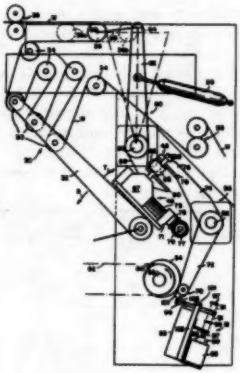
subjecting the running, continuous web to succeeding cutting operations, each cutting operation making an angular cut which produces a first cut edge which is perpendicular to, and contiguous with one of the opposite parallel edges of the web and a second cut edge which is inclined relative to, and contiguous with both the first cut edge and the other of the opposite parallel edges, the first cut edge constituting an edge of the first portion of a blank and the second cut edge constituting an edge of the second portion of such a blank.

4,702,731

THERMOPLASTIC BAG MACHINE

Emiel Y. Lambrecht, Gijzegem - Aalst, and William Van Der Gucht, Aalst, both of Belgium, assignors to FMC Corporation, Chicago, Ill.

Continuation of Ser. No. 703,000, Feb. 19, 1985, abandoned.
This application Nov. 10, 1986, Ser. No. 928,742
Claims priority, application Belgium, Mar. 27, 1984, 212638
Int. Cl.[4] B31B *1/10, 19/18, 19/86*; B65H *23/16*
U.S. Cl. 493—196 **14 Claims**



1. A bag making machine for making bags from maintaining substantially constant tension in a flattened tubular web of thermoplastic material, comprising means for intermittently making bags from said web, a pair intermittently operating draw rolls for intermittently feeding the web to said bag making means, means for continuously advancing the web towards said draw rolls, dancer arm and roll means biased in one direction against tension in the web for accumulating the web in serpentine fashion between said continuously advancing means and said intermittently operating draw rolls, wherein the improvement comprises:

an idler roller along the path of the web between the draw rolls and the dancer arm and roll means, means for synchronously moving the idler roller in one longitudinal direction in timed relation with the non-operating periods of the draw rolls for accumulating the web advancing from the dancer arm and roll means and for synchronously moving the idler roller in another longitudinal direction in timed relation with the operating periods of the draw rolls for paying out the web advancing from the dancer arm and roll means thereby maintaining tension in the web between the dancer arm and roll means and the draw rolls, whereby the serpentine web portion is maintained at a substantially constant length thereby maintaining substantially constant tension in the web.

4,702,732

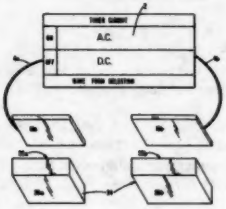
ELECTRODES, ELECTRODE ASSEMBLIES, METHODS, AND SYSTEMS FOR TISSUE STIMULATION AND TRANSDERMAL DELIVERY OF PHARMACOLOGICALLY ACTIVE LIGANDS

Whitney R. Powers, Topsfield, Mass., and Henry Sisun, Pawtucket, R.I., assignors to Trustees of Boston University, Boston, Mass.

Continuation-in-part of Ser. No. 685,425, Dec. 24, 1984, abandoned. This application Nov. 21, 1986, Ser. No. 935,057

Int. Cl.[4] A61N *1/30*

U.S. Cl. 604—20 27 Claims



1. An electrode to be used with a source of energy for active transdermal delivery of a pharmacologically active ligand to a subject comprising:

a hydrophilic, porous, polymeric matrix which supports a confluent aqueous phase and has an initial ohmic resistance not greater than 500 ohms per square inch in the absence of an electrically conductive salt solution substantially above 1.0% in concentration;

a pharmacologically active ligand in communication with said polymeric matrix; and

means for conveying energy from the energy source to said polymeric matrix.

4,702,733

FOOT ACTUATED PINCH VALVE AND HIGH VACUUM SOURCE FOR IRRIGATION/ASPIRATION HANDPIECE SYSTEM

George M. Wright, Mission Viejo, and Larry W. Blake, Irvine, both of Calif., assignors to Innovative Surgical Products, Inc., Santa Ana, Calif.

Filed Nov. 22, 1985, Ser. No. 801,068

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—34 2 Claims

1. An irrigation/aspiration handpiece system comprising:

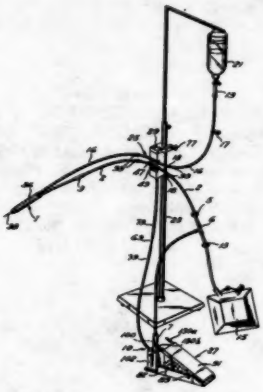
a pressurized source of fluid;

a source of constant vacuum;

a handpiece with a first channel connected by a first flexible tube to said fluid source and a second channel connected by a second flexible tube to said source of constant vacuum;

a pinch clamp into which said first and second tubes are inserted, adapted to control the flow of fluid in said system by the selective compression and release of said tubes;

a foot pedal mechanically connected to said pinch clamp to control said compression and release of said tubes by said pinch clamp, said pinch clamp comprising a first and second shaft adapted to reciprocate within said pinch clamp in response to said mechanical connection, said first shaft connected to reciprocate in direct response to movements of said foot pedal, said second shaft connected to reciprocate in response to reciprocation of said first shaft; and



a high vacuum source controlled by said foot pedal and communicating with said second channel to provide a controlled source of increased vacuum to said handpiece.

4,702,734

METHOD OF PROMOTING PERIODONTAL REGENERATION AND FIBROBLAST BONDING

Victor P. Terranova, Gaithersburg, Md.; Ulf M. E. Wikesjo, Williamsville; Robert J. Genco, Buffalo, both of N.Y.; Susanne Hic, Washington, D.C., and Raymond M. Lyall, Gaithersburg, Md., assignors to Meloy Laboratories, Inc., Springfield, Va.

Filed May 8, 1986, Ser. No. 861,195

Int. Cl.[4] A61M *31/00*

U.S. Cl. 604—54 2 Claims

1. A method of promoting periodontal regeneration and fibroblast bonding in humans, wherein the method comprises

(a) exposing periodontal area requiring treatment by methods producing a flap;

(b) applying a tetracycline salt at a dose of 25–200 mg/ml to the exposed area to be treated;

(c) allowing the tetracycline salt to have contact with the treated area for 1–10 minutes;

(d) flushing the treated area;

(e) drying the treated area;

(f) applying fibronectin at a dose of 2–10 mg/ml to the treated area for at least 4 minutes;

(g) optionally flushing the treated area;

(h) optionally applying Endothelial Cell Growth Factor at a dose of 1–10 microgram/ml; and

(i) repositioning the flap and suturing.

4,702,735

ASSEMBLY OF BREAKAWAY NEEDLE AND CATHETER

Ronald B. Luther, Newport Beach, Calif.; Daniel R. Snyder, and Craig M. Whitehouse, both of Branford, Conn., assignors to DRS Infusion Systems, Inc., Branford, Conn.

Filed Dec. 20, 1985, Ser. No. 811,807

Int. Cl.[4] A61M *5/18*

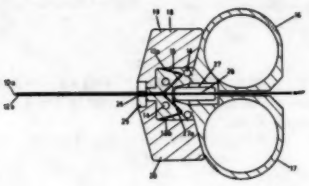
U.S. Cl. 604—161 5 Claims

1. A single hand operable assembly of a breakaway needle and catheter, comprising:

a. a splittable cannula needle providing separated proximal ends and a needle tip;

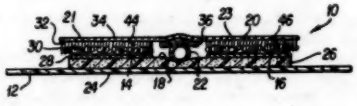
b. a splittable base for supporting the proximal ends of said splittable cannula and attached thereto;

c. finger grips extending from the base, each grip being formed with an opening and adapted for gripping with fingers of one hand by a user;
d. taping wings supporting and attached to the base, the taping wings being adapted for attachment to a user's body;
e. catheter support means attached to the taping wings and positioned forwardly of said base;
f. base splitting means attached to the taping wings and located rearwardly of said catheter support means and spaced therefrom to position said base between said catheter support means and said base splitting means for splitting said base and said cannula upon retraction of said base



and said cannula from said support means towards said base splitting means; and,
g. a catheter extending within the needle to the needle tip, the catheter being secured to the taping wings by the catheter support means; whereby:
h. when the finger grips are gripped by a user, the needle and catheter can be simultaneously inserted into the user's body to form a puncture site; ii. upon retraction of the needle, the base and needle are adapted to be split against the base splitting means and separated from the catheter; iii. the catheter will remain in the puncture site; and, iv. the taping wings and attached catheter are adapted to be secured to the user's body.

4,702,736
UNIVERSAL CLAMP
Glenda Kalt, 2640 Hollywood Blvd., Suite 200, Hollywood, Fla. 33020; Dale K. Straub, Los Angeles, Calif., and Peter Piwonka, Munich, Fed. Rep. of Germany, assignors to Glenda Kalt, Boca Raton, Fla.
Filed May 3, 1985, Ser. No. 730,344
Int. Cl.[4] A61M *25/02*
U.S. Cl. 604—180 **26 Claims**



1. A clamp for holding an article to an object comprising:
(a) base means for adhering the clamp to the object;
(b) flap means formed separately from said base means;
(c) securing means for securing each end of said flap mens to said base means and including a first holding means for holding a first end of said flap means to said base means and a second holding means for holding a second end of said flap means to said base means, said second holding means being spaced from said first holding means a sufficient distance for the article to extend therebetween, said first and second holding means being completely releasable and reattachable to said base means such that said flap can be completely separated from said base means; and
(d) a resilient pad means having an adhesive surface located between said first and said second holding means for contacting said article whereby said adhesive surface is movable with the article with respect to said flap means to some extent due to the deformation of said flap means without breaking the contact.

4,702,737
DUAL DOSE SYRINGE
Joanne L. Pizzino, 1426 Sugar Knoll Dr., Akron, Ohio 44313
Filed Jul. 14, 1986, Ser. No. 885,416
Int. Cl.[4] A61M *5/08*
U.S. Cl. 604—191 **15 Claims**

1. A pre-filled multiple dose, single barrel syringe for dispensing at least two fluids in predetermined sequence, said syringe comprising:
(a) a barrel comprising a plurality of telescoping sections of progressively decreasing diameter;
(b) a thin puncturable fluid tight membrane extending across the forward end of each barrel section except the first and reciprocable therewith, said membrane dividing the interior of said barrel into a plurality of separate fluid-receiving chambers each of said chambers being pre-filled with a fluid;
(c) a plunger received in the last barrel section and including a portion extending exteriorly of the barrel;
(d) sealing means providing fluid tight seals between successive barrel sections and between the last barrel section and said plunger;
(e) needle receiving means at the forward end of the first barrel section, and
(f) a hollow meedle extending through said needle receiving means, said needle being sharply pointed at both ends, a portion of said needle being inside said barrel and a portion of said needle being outside said barrel.

4,702,738
DISPOSABLE HYPODERMIC SYRINGE AND NEEDLE COMBINATION HAVING RETRACTABLE, ACCIDENT PREVENTING SHEATH
Treesa A. Spencer, 2818 S. Diamond, Santa Ana, Calif. 92704
Filed May 22, 1986, Ser. No. 866,151
Int. Cl.[4] A61M *5/32*
U.S. Cl. 604—198 **8 Claims**

1. A combination of a hypodermic needle and syringe of the type which is discardable after a single use, the combination comprising:
a syringe barrel having a plunger mounted in the barrel;
a hypodermic needle mounted to the barrel at an end of the barrel which is opposite to the end where the plunger enters the barrel;
a sheath mounted to the barrel and extending therefrom in a first position to substantially cover the needle and thereby prevent the needle from accidental contact with a foreign object or person during transportation and storage of the combination;
two parallel interconnected channels formed in the external surface of the barrel, and a boss formed in the interior surface of the sheath, the first channel and the boss jointly comprising means for permitting movement of the sheath upward on the barrel into a second position wherein the needle is at least partially exposed, and the second channel and the boss jointly comprising means for permitting movement of the sheath downward on the barrel into a third position wherein the needle is substantially covered

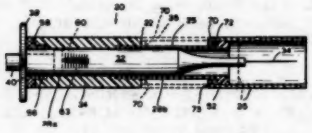
by the sheath and for substantially irreversibly locking the sheath to the barrel in the third position, whereby the needle is protected when the combination is discarded after normal use, the boss being guided and riding in the first and second channels.

4,702,739

HOLDER FOR A SYRINGE TO FACILITATE INJECTION PROCEDURE

Milosevic M. Milorad, Dimitrija Tucovica 45, 11000 Beograd, Yugoslavia

Filed Sep. 4, 1986, Ser. No. 903,778
Claims priority, application Yugoslavia, Nov. 27, 1985, 1847/85; Jan. 20, 1986, 1374/86
Int. Cl.[4] A61M 5/32
U.S. Cl. 604—198 12 Claims



1. Device for facilitating insertion of the needle of a hypodermic syringe-needle unit into a human body part during employment of such unit for injection or fluid aspiration purposes, said device comprising:

an elongated holder for reception and encirclement of the syringe-needle unit with the needle extending a distance beyond one end of the holder,

a sleeve captively received on said holder and slidable thereon from a retracted position wherein one end of said sleeve is proximate said one end of the holder to an extended position wherein the sleeve encircles the needle and its said one end projects beyond the needle tip end, and

cooperating detent means carried on said sleeve and said holder and operable when said sleeve is in extended position for inhibiting initiation of retraction sliding of said sleeve when said one end of said sleeve is contactingly placed by the user against the body part for positioning the needle tip end proximate said body part,

said detent means comprising magnet means carried on the said one end of said holder and the other end of said sleeve,

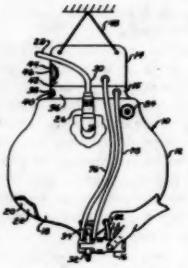
said detent means being readily releasable under the impetus of the force resulting from the user effecting unitary needle insertion movement of said holder and syringe-needle in the direction of the body part, said unitary movement being terminated by abutment engagement of said holder against said sleeve and correspondingly the depth of penetration of the needle into the body limited.

4,702,740

COLLECTION SYSTEM WITH VALVE MEMBERS

David A. Bates, Libertyville, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Jul. 21, 1982, Ser. No. 400,529
Int. Cl.[4] A61M 1/00
U.S. Cl. 604—323 11 Claims



1. A collection system for body fluids, comprising:

a receptacle having a collection chamber for retaining the body fluids and a discharge line;

a first container having a supply chamber and a discharge line;

a bactericide in the supply chamber;

a second container having a supply and discharge line and a holding chamber, said holding chamber being located above a lower portion of the collection chamber, and said supply chamber being located above a lower portion of the holding chamber; and

a two position clamp having first and second valve means each movable to a closed position, said first valve shutting off the discharge line from the collection chamber and the discharge line from said first container, said second valve shutting off supply from the second container to the collection chamber and means for opening said first valve means while closing said second valve means and for closing said first valve means while opening said second valve means

4,702,741

POLYOXYALKYLENE SPIN FINISH LUBRICANTS HAVING LOW COEFFICIENTS OF FRICTION

Edward M. Dexheimer, Grosse Ile, Mich., assignor to BASF Corporation, Parsippany, N.J.

Filed Mar. 25, 1985, Ser. No. 715,346

Int. Cl.[4] D06M *15/00*

U.S. Cl. 8—115.6 20 Claims

1. In a process for high-speed synthetic fiber finishing wherein a fiber finishing composition containing one or more fiber lubricants, emulsifiers, antistats, and other fiber processing auxiliaries is coated onto the fiber, the improvement comprising employing as a fiber lubricant a block copolymer polyether prepared by first oxyethylating an initiator selected from the group consisting of ethylenediamine, N,N,N',N'-tetrakis[2-hydroxyethyl]ethylenediamine, N,N,N'N'-tetrakis[2-hydroxypropyl]ethylenediamine, and N,N,N'N'-tetrakis[2-hydroxybutyl]ethylenediamine, and subsequently oxypropylating the oxyethylated initiator, wherein said polyether has a molecular weight of from about 10,000 to about 30,000 Daltons, and a polyoxyethylene hydrophile content of from about 60 percent to 95 percent by weight of the polyether.

4,702,742

AQUEOUS JET-INK PRINTING ON TEXTILE FABRIC PRE-TREATED WITH POLYMERIC ACCEPTOR

Kazuo Iwata, and Shoji Koike, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1985, Ser. No. 804,107

Claims priority, application Japan, Dec. 10, 1984, 59-259247; Dec. 10, 1984, 59-259248; Dec. 10, 1984, 59-259249; Dec. 10, 1984, 59-259250

Int. Cl.[4] D06B *1/02;* D06P *1/52;* B41J *3/04*

U.S. Cl. 8—495 15 Claims

1. In a method for textile printing comprising depositing an aqueous jet-ink containing a dye on a textile fabric by ink jet printing, the improvement comprising coating the textile fabric with an 0.5 to 30 micron thick film of an ink acceptor prior to depositing the aqueous jet-ink on the textile fabric; said ink acceptor comprising a water soluble or hydrophilic natural or synthetic polymer capable of rapidly absorbing the aqueous jet-ink.

4,702,743

LIQUID DYE PREPARATIONS ANIONIC DYES AND POLYALKYLENE-OXY NAPHTHALENE DERIVATIVES

Patrick O'Callaghan, Baldock, and Henry R. Murton, Prestwich, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

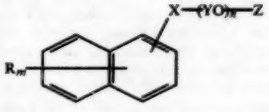
Filed May 5, 1986, Ser. No. 859,712

Claims priority, application United Kingdom, May 16, 1985, 8512401

Int. Cl.[4] C09B *67/00, 67/26*

U.S. Cl. 8—527 9 Claims

1. A liquid dye preparation comprising an aqueous solution containing at least 0.5% by weight of a water-soluble anionic dye and at least 0.1% by weight of a surfactant of the formula:



wherein

R represents a non-ionic substituent selected from the group consisting of halogen, alkoxy, alkenyl and alkyl,

m represents an integer from 0 to 3,

X represents a divalent bridging group selected from the class consisting of —S—, —COO— and —NQ— wherein Q is hydrogen, lower, alkyl or a further $(YO)_nZ$ group,

Y represents a C_{2-4} alkylene radical,

n represents an integer of at least 2, and

Z represents hydrogen, alkyl or sulpho.

4,702,744

PROCESS FOR THE PREPARATION OF CONCENTRATED SOLUTIONS OF ANIONIC DYESTUFFS AND DYESTUFF ADDITIVES BY CATION EXCHANGE WITH CATION EXCHANGE RESIN

Joachim Wolff, Bergisch Gladbach; Jochen Koll, Odenthal; Karlheinz Wolf, Leverkusen; Reinhold M. Klipper, Cologne, and Peter M. Lange, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 27, 1986, Ser. No. 867,855

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1985, 3521129

Int. Cl.[4] C09B *67/24, 69/02*

U.S. Cl. 8—527 19 Claims

1. A process for the preparation of concentrated aqueous solutions of anionic dyestuffs and anionic dispersing agents, using as starting materials solutions or dispersions of these substances having a salt content of ≦5 percent by weight, comprising replacing $Na^{\oplus}$ ions of the dyestuff salts or the dispersing agent salts by $Li^{\oplus}$ and/or NZ_3, in which Z=H or unsubstituted or substituted alkyl, without intermediate isolation of the free acids on which the dyestuffs or agents are based, wherein the cation exchange is carried out by means of cation exchangers in the form of pearls or granules which are insoluble in the reaction medium.

4,702,745

PROCESS FOR DEWATERING HIGH MOISTURE, POROUS ORGANIC SOLID

Takao Kamei, Ashiya; Fuminobu Ono; Keiichi Komai, both of Akashi; Takeshi Wakabayashi, Kobe; Takayuki Ogawa, Yokohama; Hideaki Ito, Chigasaki, and Kiyoshi Shirakawa, Machida, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe and Electric Power Development Co., Ltd., Tokyo, both of, Japan

Filed May 1, 1986, Ser. No. 857,944

Claims priority, application Japan, May 2, 1985, 60-94948

Int. Cl.[4] C10L *5/06;* F26B *5/04*

U.S. Cl. 44—10 D 28 Claims

1. A process for dewatering a high moisture porous organic solid comprising steps of

(1) heating the high moisture porous organic solid in a fluid medium having an elevated temperature and a high pressure, thereby reducing the moisture of the solid,

(2) starting to compress the porous structure of the solid by mechanical means, while maintaining the temperature and the pressure of the surrounding fluid medium the same as in the final stage of the step (1), and

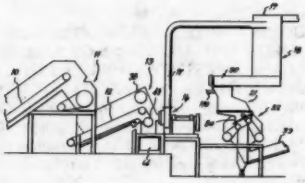
(3) lowering the pressure of the surrounding fluid medium while maintaining the mechanical compression of the solid.

6. A process according to claim 1, wherein the fluid medium is water and/or steam.

4,702,746
SYSTEM FOR PRODUCING FUEL PELLETS

Maurice Finch, Worcester, England, assignor to Simon-Barron Limited, Gloucester and Henley Burrowes & Co. Ltd., Worcester, both of, England

Filed Jan. 23, 1986, Ser. No. 824,579
Claims priority, application United Kingdom, Jan. 24, 1985, 8501830; Mar. 20, 1985, 8507249; Mar. 20, 1985, 8507250
Int. Cl.[4] C10L *5/36*
U.S. Cl. 44—14 15 Claims



1. A system for producing fuel pellets from dry and friable waste materials comprising:

a shredder including separate devices rotating on a common shaft for cutting and boating incoming materials to expose a fibrous content thereof, and an assembly of fixed screen bars through which the cut and beaten material is projected to determine its size;

means for temporarily storing materials received from the shredder;

means for creating an airstream to convey the materials from the shredder to the storing means;

a densifier connected to the storing means to receive material therefrom and to compress it into a densified mat;

a pelleting press connected to the densifier and having an annular die and one or more press rollers co-operating with the die;

means for directing the material entering the press into the nip between the die and the or each press roller; and

means for cutting the material extruded from the die into pellets.

4,702,747
COAL DERIVED/CARBON DIOXIDE FUEL SLURRY AND METHOD OF MANUFACTURE

Edmond G. Meyer, Laramie, Wyo., and Lee G. Meyer, Englewood, Colo., assignors to Carbon Fuels Corporation, Englewood, Colo.

Continuation-in-part of Ser. No. 427,937, Sep. 29, 1982, Pat. No. 4,475,924, which is a continuation-in-part of Ser. No. 247,382, Mar. 24, 1981, abandoned. This application Sep. 19, 1984, Ser. No. 651,947
Int. Cl.[4] C10L *1/32*
U.S. Cl. 44—51 19 Claims

1. A fluidic, substantially non-polluting fuel transportation system comprising a liquid/solid mixture, including a portion of a particulate coal char, dispersed in an amount of liquid carbon dioxide effective to produce a transportable composition, wherein substantially all of the solid portion is separated at the destination for use as a solid fuel.

4,702,748
PROCESS FOR STABILIZATION OF COAL LIQUID FRACTIONS

Geoffrey Davies, Boston, Mass., and Ahmed El-Toukhy, Alexandria, Egypt, assignors to Northeastern University, Boston, Mass.

Continuation-in-part of Ser. No. 640,012, Aug. 10, 1984, Pat. No. 4,632,675. This application Mar. 12, 1986, Ser. No. 838,677
The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.
Int. Cl.[4] C10L *1/18, 1/32*
U.S. Cl. 44—56 8 Claims

1. A process for stabilizing a composition of coal liquid and petroleum-derived liquid fractions with respect to gum deposition, comprising:

preparing said composition to contain cyclohexanol at a level of from 5% to 20% by weight of the coal liquid employed, and storing the composition in a sealed container.

3. A composition of coal liquid and petroleum-derived liquid fractions stabilized with respect to gum deposition, consisting essentially of a combination of the following materials:

a coal liquid fraction;

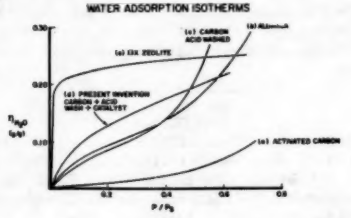
a petroleum-derived liquid fraction; and

cyclohexanol, present in the composition at a level of from 5% to 20% by weight of the coal liquid fraction employed.

4,702,749
TECHNIQUE FOR SURFACE OXIDATION OF ACTIVATED CARBON

Shivaji Sircar, Wescosville, and Timothy C. Golden, Allentown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 24, 1986, Ser. No. 877,827
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—33 11 Claims



1. A method of activating a carbon adsorbent which comprises oxidizing the surface of said carbon adsorbent with a mild oxidizing acid in the presence of a metal oxidation catalyst at an elevated temperature and boiling the mixture of said carbon adsorbent, mild oxidizing acid and metal oxidation catalyst to dryness; then rinsing the surface oxidizing carbon adsorbent with water; and drying the rinsed surface oxidized carbon adsorbent.

11. In a process for the removal of water or carbon dioxide from a gas stream containing water or carbon dioxide of the type wherein said gas stream containing water or carbon dioxide is contacted with a solid phase adsorbent under pressure-swing adsorption or thermal-swing adsorption processing conditions, the improvement comprising utilizing an adsorbent produced by the activation of a carbon adsorbent, said activation comprising oxidizing the surface of said carbon adsorbent with a mild oxidizing acid in the presence of a metal oxidation catalyst at an elevated temperature and boiling the mixture of said carbon adsorbent, mild oxidizing acid and metal oxidation catalyst to dryness; then rinsing the surface oxidized carbon adsorbent with water; and drying the rinsed surface oxidized carbon adsorbent.

4,702,750

PROCESS FOR SEPARATING UNDESIRABLE COMPONENTS FROM GASEOUS MIXTURES

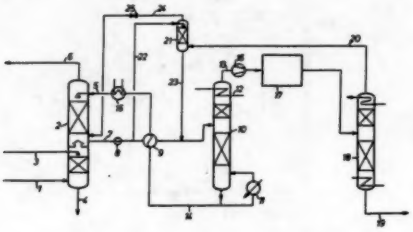
Hans Becker, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Feb. 18, 1986, Ser. No. 830,294

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1985, 3505590

Int. Cl.[4] B01D *47/00*

U.S. Cl. 55—48 15 Claims



1. In a process for the separation of undesirable components from a gaseous mixture comprising undesirable components and inert gases, said undesirable components including SO_2 and said inert gases including CO_2, comprising

(a) scrubbing said gaseous mixture in a first scrubbing column with a physical absorbing agent to absorb SO_2 and CO_2,

(b) regenerating said absorbing agent in a regenerating column and recycling regenerated absorbing agent to the first scrubbing column, wherein SO_2 and CO_2 gases are released from the absorbing agent during regeneration,

(c) delivering said SO_2 and CO_2 gases released during regeneration to an additional separation column wherein the SO_2 and CO_2 are separated into a first stream comprising SO_2 and a second stream comprising SO_2 and CO_2, said second stream being recycled to said first scrubbing column,

wherein the improvement comprises removing SO_2 from said second stream in a second scrubbing column by contacting said second stream with a second physical absorbing agent, prior to recycling said second stream to said first scrubbing column.

4,702,751

GRANULAR FILTER AND METHOD OF OPERATING SAME

Wilhelm Leussler, Frankfurt am Main, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 18, 1986, Ser. No. 932,190

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541174

Int. Cl.[4] B01D *46/04*

U.S. Cl. 55—96 20 Claims

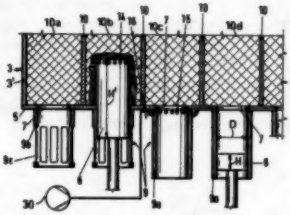
1. A method of operating a granular filter which comprises the steps of:

providing a granular bed in a filter chamber defined by a bottom wall, a pair of sidewalls and a pair of vertical fluid-permeable walls closing opposite ends of said chamber

passing a fluid to be filtered through said bed in one horizontal direction, said fluid traversing said fluid-permeable walls;

at time-spaced intervals terminating the flow of the fluid to be filtered and passing a back-flushing fluid through said bed to remove material trapped by said bed; and

at least upon the passage of said back-flushing fluid through said bed, loosening the granular bed by imparting an



up-and-down movement to at least one piston adapted to project through said bottom wall into said bed.

4,702,752

ELECTROSTATIC DUST COLLECTOR

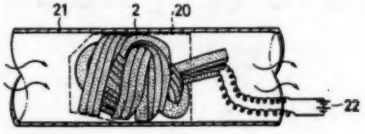
Motoo Yanagawa, Tokyo, Japan, assignor to Research Development Corporation of Japan and Ishimori & Co., Ltd., both of Tokyo, Japan

Division of Ser. No. 754,314, Jul. 12, 1985. This application Feb. 18, 1987, Ser. No. 16,156

Claims priority, application Japan, May 30, 1985, 60-115342; May 30, 1985, 60-115343

Int. Cl.[4] B03C *3/45*

U.S. Cl. 55—131 1 Claim



1. An electrostatic dust collector comprising a filter element formed of narrow elongated strips of pliable, porous dielectric material superimposed, in face to face contact, with electrodes therebetween, so that no air gap exists between said face to face strips, means for applying an electrical voltage to said electrodes for forming an electrical field in the pores of said porous dielectric material and means for passing gas containing particles through said pores of said porous material to electrically charge said particles and to attract said charged particles to a wall of said pores charged by said electrical field to remove said charged particles from said gas passing therethrough,

said filter element being randomly packed into a bag made of a net formed of an insulating material, said bag being disposed in a gas passage to form a dust collector for gas passed through said passage.

4,702,753

AIR PURIFIER-COMBINATION FILTER

Thaddeus Kowalczyk, 8163 Lochdale, Dearborn Hts., Mich. 48127

Continuation-in-part of Ser. No. 854,548, Apr. 21, 1986, abandoned. This application Dec. 11, 1986, Ser. No. 940,352

The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.[4] B01D *46/00*

U.S. Cl. 55—267 8 Claims

1. A pollution cleaning system for the passenger compartment of a motor vehicle, comprising:

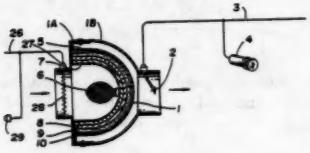
a plenum;

a filter positioned in the plenum and including a housing

containing a replaceable filter element having multiple layers providing a surface area for contact with air passing therethrough, to remove pollutants emitted from exhaust fumes and allergens-pollen from the air, and prevent such pollutants from entering the motor vehicle interior,

an air inlet for introducing outside air into said plenum;

a heater located between the air inlet and the filter to raise the temperature of the outside air by an amount necessary to protect the filter from freezing and to keep the filter dry and monitoring means for generating an electrical signal



indicating that said filter is clogged with dirt, said monitoring means including a sensor switch having a movable sensor plate mounted on the downstream side of and in the path of air flowing through said filter so as to be moved to a first position in which said switch is open and said signals prevented from being generated, said monitoring means including means of biasing said sensor plate to a second position in the absence of sufficient air flow through said sensor switch generating said signal in response to the movement of said sensor plate to said second position.

4,702,754

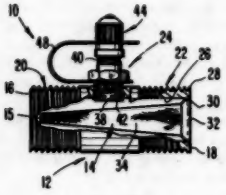
VAPOR DELIVERY PRESSURE TEST ADAPTER

William C. Blocker, 1406 N. Butler Ave., Indianapolis, Ind. 46219

Filed Apr. 4, 1986, Ser. No. 848,232

Int. Cl.[4] B01D *46/00*

U.S. Cl. 55—274 **20 Claims**



1. A vapor delivery pressure test adapter for installation at the outlet of a vapor delivery pressure regulator within a self-contained vapor delivery apparatus, comprising:

a nipple that is sized to be integrally received within said apparatus, including a vapor pipe with a first pipe end and a second pipe end, and external screw threads at said first and second pipe ends; and

delivery pressure test means externally and piercingly mounted to said pipe between said first pipe end and said second pipe end to permit external measurement of vapor delivery pressure within said pipe, said delivery pressure test means including a vapor check valve piercingly mounted to said pipe between said first pipe end and said second pipe end.

4,702,755

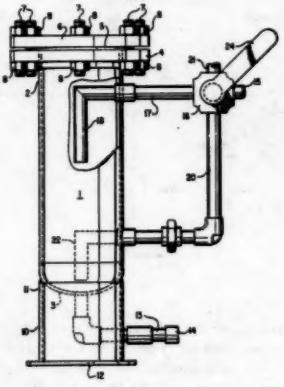
DRIP TRAP

Kevin Bishop, 134 Forge Road S. E., Calgary, Alberta T2H 0S8, Canada

Filed Mar. 24, 1986, Ser. No. 842,976

Int. Cl.[4] B01D *51/00*

U.S. Cl. 55—418 **3 Claims**



1. A drip trap for separating a liquid from a gas, comprising casing means; inlet means in the top end of said casing means for introducing a liquid-containing gas into said means; downspout means on said inlet means extending downwardly in said casing means; downspout means and outlet means for discharging liquid from the bottom end of said casing means; and valve means connected to said inlet means and said outlet means, in one position said valve means permitting the entry of liquid-containing gas into said casing means while preventing the escape of liquid through said outlet means; and in a second position said valve means closing said inlet means while opening said outlet means to permit the discharge of liquid under pressure from said gas after the liquid has risen to a level above the lower end of said downspout means.

4,702,756

ENGINE INTAKE SYSTEM HAVING A SUPERCHARGER

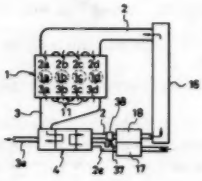
Tsunao Yajima, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Continuation of Ser. No. 716,661, Mar. 27, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 9,066

Claims priority, application Japan, Mar. 27, 1984, 59-60084; Apr. 10, 1984, 59-52364[U]

Int. Cl.[4] B01D *46/12*

U.S. Cl. 55—473 **4 Claims**



1. An engine intake system including a supercharger of a type comprising a casing, a rotor provided in said casing for rotation and having a plurality of axially extending cells which are arranged in circumferential direction with respect to each other, a first end wall provided on said casing at an end adjacent to one axial end of said rotor and formed with exhaust gas

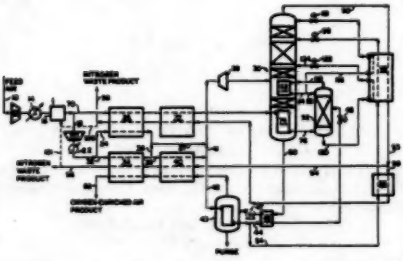
inlet port means and exhaust gas outlet port means, a second end wall provided on said casing at the other axial end of the rotor and formed with intake air inlet port means and intake air outlet port means, wherein intake air introduced into the rotor through the intake air inlet port means is compressed in said rotor under pulsating pressure of the exhaust gas introduced into the rotor before the intake air is discharged through the intake air outlet port means, a part of the intake air being passed through the axially extending cells to the exhaust gas outlet port means to cool the rotor, first intake passage means connected with said intake air inlet port means, second intake passage means connecting said intake air outlet port means with engine combustion chamber means, first exhaust passage means connecting said exhaust gas inlet port means with said engine combustion chamber means, second exhaust passage means connected with the exhaust gas outlet port means, bypass passage means bypassing said supercharger and extending between said first and second intake passage means, bypass valve means for normally closing said bypass passage means and opening the bypass passage means at least in an engine start period, intake air cooling means provided in said second intake passage means for cooling the intake air from the intake air outlet port means, first and second air cleaner means including first filter element means located in the first intake passage means upstream of a portion where the bypass passage means is connected with the first intake passage means, characterized by the fact that said first filter element means is of a relatively large mesh size, said first and second air cleaner means including second filter element means provided in said second intake passage means downstream of a portion where the bypass passage means is connected with the second intake passage means, said second filter element means being of a mesh size smaller than that of said first filter element means.

4,702,757

DUAL AIR PRESSURE CYCLE TO PRODUCE LOW PURITY OXYGEN

William T. Kleinberg, Breinigsville, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Aug. 20, 1986, Ser. No. 898,280
Int. Cl.[4] F25J 3/02
U.S. Cl. 62—24 **5 Claims**



1. A process for the production of oxygen-enriched air by the fractionation of air in a double distillation column having high pressure and low pressure columns, which comprises the steps of:

(a) compressing a feed air stream and splitting said feed air stream into a first feed air stream and a second feed air stream;

(b) compressing the first feed air stream, prior to splitting said first feed air stream into a first and second substream;

(c) cooling said first substream and second substream;

(d) combining said first substream with at least a portion of said second substream, thus forming a combined low pressure column feed stream and leaving a first remaining portion of the second substream, and expanding said combined low pressure column feed stream prior to being introduced into an intermediate location of the low pressure column;

(e) condensing said first remaining portion of the second substream, thus producing a condensed first remaining portion of the second substream;

(f) subcooling, reducing in pressure and feeding at least a portion of said condensed first remaining portion of the second substream to the high pressure column, thus leaving a condensed second remaining portion of the second substream, subcooling and reducing in pressure the condensed second remaining portion of the second substream prior to being introduced in the low pressure column as reflux;

(g) cooling and then feeding said second feed air stream to a reboiler in a lower portion of the low pressure column, thereby partially condensing said second feed air stream, thus producing a partially condensed second air feed stream;

(h) feeding said partially condensed second feed air stream to the high pressure column;

(i) removing an overhead stream from the top of said high pressure column, condensing said overhead stream in an intermediate reboiler located in the low pressure column, subcooling and reducing in pressure at least a portion of the overhead prior to introducing it into the top of the low pressure column as reflux, and feeding the remaining overhead into the top of the high pressure column as reflux;

(j) removing a bottoms liquid stream from the high pressure column, subcooling and reducing in pressure said bottoms liquid stream prior to being introduced into the low pressure column as an intermediate relux; and

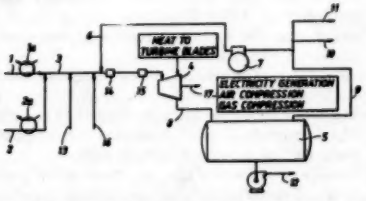
(k) removing a liquid oxygen-enriched air stream from the low pressure column, and warming and vaporizing said liquid oxygen-enriched air stream.

4,702,758

TURBINE COOLING WAXY OIL

Julia S. Geer, Bellaire, Tex., assignor to Shell Western E&P Inc., Houston, Tex.

Filed May 29, 1986, Ser. No. 868,920
Int. Cl.[4] B01D 9/04
U.S. Cl. 62—532 **25 Claims**



1. A process for pipelining a waxy oil to essentially eliminate deposition of wax on the pipeline wall, comprising:

providing a pressurized mixture of said waxy oil and a gas;

effecting a sudden pressure drop of said mixture of the oil and the gas through an expansion turbine, thereby expanding the gas and quickly cooling the oil to below its cloud point in the substantial absence of wax deposition and forming a slurry of wax particles and oil; and

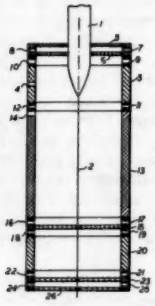
pipelining the slurry.

4,702,759

APPARATUS FOR REDUCING VOLUME AND SURFACE DEFECTS IN SILICA OPTICAL-FIBRES

Giacomo Roba, Cogoleto, Italy, assignor to Cselt-Centro Studi e Laboratori Telecommunicazioni S.p.A., Turin, Italy

Division of Ser. No. 817,025, Jan. 8, 1986, Pat. No. 4,659,354.
This application Nov. 13, 1986, Ser. No. 930,804
Claims priority, application Italy, Mar. 18, 1985, 67265 A/85
Int. Cl.[4] C03B *37/023*; C03C *25/02*
U.S. Cl. 65—13 2 Claims



1. An apparatus for drawing silica optical fibers with reduced volume and surface defects, comprising:

a first furnace for heating an elongated silica-glass optical preform to a glass softening tempeature and including:

at an upper end thereof two spaced apart disks with aligned central holes through which said preform penetates from a top of the apparatus,

means for introducing an inert gas between said disks, means for drawing gas out of said first furnace at an upper part thereof below said disks, and

means for introducing a gas at a lower part of the first furnace, the gas introduced at said lower part being selected from the group which consists of a reducing gas and a gas for supplying nascent-state carbon;

a second furnace below said first furnace and aligned therewith for heating an optical fiber drawn from an end of said preform in said first furnace to a temperature slightly higher than the vitreous transition temperature of the silica glass and including:

a disk with a central hole at a bottom of said second furnace, the central hole being traversed by said fiber, and:

means for injecting an inert gas heated to a temperature slightly exceeding said vitreous transition temperature at a lower part of the second furnace; and

a conditioner below said second furnace and aligned therewith and traversed by said optical fiber for cooling the optical fiber to a temperature of at most ambient temperature, said conditioner being closed at its bottom by two spaced apart disks having aligned central holes traversed by the fiber and being provided with:

means for injecting an inert gas between the disks of said conditioner, and

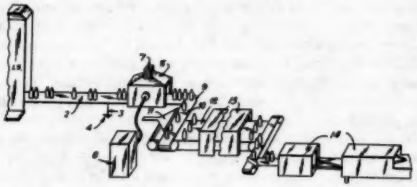
means for introducing a cool inert gas into said conditioner at a lower part thereof above said disks of said conditioner.

4,702,760

METHOD FOR STRENGTHENING GLASS ARTICLES THROUGH ELECTROSTATIC IONIC INTERCHANGE

José L. Garcia de Leon, Nuevo Leon, Mexico, assignor to Vitro-Tec Fideicomiso, Monterrey, Mexico

Filed Oct. 15, 1985, Ser. No. 787,601
Claims priority, application Mexico, Oct. 16, 1984, 203061
Int. Cl.[4] C03C *21/00*
U.S. Cl. 65—30.14 3 Claims



1. A method of strengthening glass articles on a production line through the use of electrostatis ionic interchange comprising:

(a) supporting said glass articles on a grounded metallic transportation belt;

(b) electrostatically charging an ion exchange medium comprising a powdered alkali metal salt or mixture of alkali metal salts wherein the alkali metal ions have a size greater than the alkali metal ions on the surface of the glass articles;

(c) spraying a flow of said electrostatically charged powdered alkali metal ions on the surface of said glass articles passing on said grounded metallic transportation belt in the line of production before the thermal treating stage in order to exchange the smaller alkali metal ions from the surface of said glass articles by the larger alkali metal ions provided by said electrostatically charged alkali metal powder; thus

(d) promoting a uniform application of said ion exchange medium on the surface of said glass articles to provide a uniform strengthening layer on the surface of said glass articles.

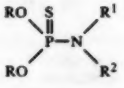
4,702,761

O,O-DIALKYL PHOSPHORAMIDOTHIOATE PLANT GROWTH ENHANCERS

Maria P. Herrero, Berkeley, and Joseph B. Holtwick, Martinez, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 28, 1986, Ser. No. 835,082
Int. Cl.[4] A01N *57/12*
U.S. Cl. 71—87 5 Claims

1. A method of enhancing the growth of gramineous crop plants which comprises applying to the foliage of said plants a non-nutritional, growth enhancing amount of an O,O-dialkyl phosphoramidothioate compound of the formula



wherein

each R independently represents C_1–C_4 alkyl, and

R^1 and R^2 each independently represent hydrogen, C_1–C_4 alkyl, or C_3–C_4 alkenyl.

4,702,762

METHOD OF PROTECTING CULTIVATIONS OF AGRARIAN INTEREST FROM THE ACTION OF NONSELECTIVE HERBICIDES

Giovanni Camaggi, Lodi; Franco Gozzo, San Donato Milanese; Ernesto Signorini, Mainate, and Ottorino Palla, Crema, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 475,959, Mar. 16, 1983, abandoned. This application May 7, 1985, Ser. No. 731,389
Claims priority, application Italy, Mar. 19, 1982, 20272 A/82
Int. Cl.[4] A01N *25/32*
U.S. Cl. 71—90 11 Claims

1. A method of reducing the damage caused to maize cultivations due to the application thereto of alachlor or eptam herbicides belonging, respectively, to the class of chloroacetanilides and of thiolcarbamates which comprises treating maize seeds, with an antidotally effective amount of a compound having the following formula:

(I)

wherein the —COOR group is in position 2 or 4 in the thiazolidine ring, R is a hydrogen atom or a C_1–C_4 alkyl, and R^1 is selected from the group consisting of a hydrogen atom, an acetyl group and an acetyl group substituted by 1 to 3 halogen atoms.

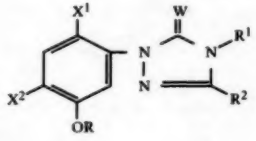
4,702,763

HERBICIDAL 1-ARYL-DELTA2-1,2,4-TRIAZOLIN-5-ONES

Lester L. Maravetz, Westfield, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 655,960, Sep. 28, 1984, abandoned, which is a continuation-in-part of Ser. No. 541,596, Oct. 13, 1983, abandoned. This application Feb. 27, 1986, Ser. No. 834,157
Int. Cl.[4] C07D *249/12;* A01N *43/653*
U.S. Cl. 71—90 8 Claims

1. An herbicidal compound of the formula



in which

X^1 is fluorine,

X^2 is chlorine or bromine,

W is oxygen,

R^1 is n-propyl, difluoromethyl, 3-fluoropropyl, cyanomethyl, or 2-propenyl,

R^2 is methyl, fluoromethyl, or difluoromethyl, and

R is 3-tetrahydrofuranyl, tetrahydrofurfuryl, tetrahydropyran-2-ylmethyl, 1,3-dioxolan-2-ylmethyl, 2-(1,3-dioxolan-2-yl)ethyl, 2,2-dimethyl-1,3-dioxolan-4-ylmethyl, 1,3-dioxan-4-ylmethyl, tetrahydro-4H-pyran-4-yl, tetrahydrothien-3-yl, 1-oxotetrahydrothien-3-yl, or 1,1-dioxotetrahydrothien-3-yl.

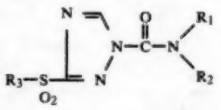
4,702,764

CARBAMOYLTRIAZOLES, AND THEIR PRODUCTION AND USE

Koji Nakayama, Osaka; Ryo Yoshida, Kawanishi, and Kouichi Morita, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 2, 1984, Ser. No. 656,885
Claims priority, application Japan, Oct. 18, 1983, 58-194603
Int. Cl.[4] C07D *249/12;* A01N *43/653*
U.S. Cl. 71—92 5 Claims

1. A compound of the formula:



wherein R_1 and R_2 are each a lower alkyl group and R_3 is a 1,3-dioxacyclopentan-2-yl(lower)alkyl group.

4,702,765

METHOD OF MAKING SELENIUM-CONTAINING AMALGAM ALLOYS FOR DENTAL RESTORATION

Atsushige Sato, 24-3-701, 4-chome, Asagayakita, Suginami-ku, Tokyo; Ishi Miura, 21-6, 3-chome, Kamimeguro, Meguro-ku, Tokyo; Yasuhiro Kumei, Tokyo; Osamu Okuno, Narashino; Tsuyoshi Nakano, Chiba, and Bunsaku Yoshida, Warabi, all of Japan, assignors to Atsushige Sato; Ishi Miura and G-C Dental Industrial Corp., all of Tokyo, Japan

Continuation of Ser. No. 687,137, Dec. 28, 1984, abandoned, which is a division of Ser. No. 478,498, Mar. 24, 1983, Pat. No. 4,528,034. This application Feb. 18, 1986, Ser. No. 829,862
Claims priority, application Japan, Apr. 2, 1982, 57-53681
Int. Cl.[4] B22F *9/08*
U.S. Cl. 75—0.5 B 2 Claims

1. A process for the preparation of selenium-containing amalgam alloys for dental restoration comprising the steps of:

melting a copper alloy containing no less than 50% by weight of copper and 0.01–5% by weight of selenium,

reducing the resulting melt to powders having a desired particle size by spraying the melt by means of a centrifugal force, and

mechanically mixing 0.1–50% by weight of the thus obtained powders with 50–99.9% by weight of a silver-tin-copper amalgam alloy powder obtained by melting a silver-tin-copper amalgam alloy, and reducing the resulting melt to a powder having a desired particle size by spraying the melt in an inert gas stream.

4,702,766

METHOD OF INCREASING CARBON CONTENT OF DIRECT REDUCED IRON AND APPARATUS

Paul M. Love, Charlotte, N.C., and Bruce G. Kelley, Tega Cay, S.C., assignors to Midrex International, B.V. Rotterdam, Zurich Branch, Zurich, Switzerland

Filed Mar. 21, 1986, Ser. No. 842,513
Int. Cl.[4] C21B *13/02;* F27B *1/26*
U.S. Cl. 75—34 13 Claims

1. In a vertical shaft-type reducing furnace having an upper reducing zone, and intermediate reducing zone and a lower carbon control and product discharge zone, means for introducing reducing gas intermediate the ends of the shaft furnace, means for removing metallized product from the bottom thereof, and means for removing reacted top gas from the top of the furnace, the improvement comprising:

a source of process gas;

a first catalyst-containing reformer furnace;

means for introducing process gas to said reformer;

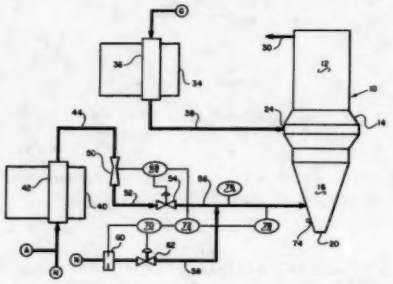
a first conduit communicating between said reformer and

the means for introducing reducing gas to the shaft furnace;

a second catalyst-containing reformer furnace;

means for introducing a mixture of air and gaseous hydrocarbon to said second reformer furnace;

a second conduit communicating between said second reformer furnace and the carbon control and product discharge zone of the shaft furnace;



a source of natural gas;

a third conduit communicating between said source of natural gas and said second conduit; and

means for controlling the respective amounts of gas introduced to said product discharge zone from said second reformer and said source of natural gas.

4,702,767

METHOD OF PURIFYING A BEARING STEEL

Yatsuka Takata, Chita; Tadamasa Yamada, Nagoya, and Eiki Kikuchi, Tokai, all of Japan, assignors to Aichi Steel Works, Ltd., Aichi and Koyo Seiko Kabushiki Kaisha, Osaka, both of, Japan

Division of Ser. No. 707,820, Mar. 4, 1985, Pat. No. 4,642,219. This application Jul. 7, 1986, Ser. No. 882,383

Claims priority, application Japan, Mar. 14, 1984, 59-50073

Int. Cl.[4] C21C *7/10*

U.S. Cl. 75—49 **3 Claims**

1. In a method of purifying a bearing steel consisting essentially of carbon, silicon, manganese, phosphorus, sulfur, chromium, aluminum, oxygen, nitrogen and titanium, the remainder being iron together with impurities, the method comprising:

(i) smelting the bearing steel in a smelting furnace in order to oxidatively scour the steel;

(ii) pouring the smelted steel into a separate container, performing dephosphorization of the smelted steel and absorbing and removing slag which contains oxide from the steel which floats on top of the smelted steel with a vacuum slag cleaner;

(iii) conducting reducing refinement of the steel by strongly agitating the smelted steel in the presence of a highly basic slag which has a basicity of not less than 3 while adjusting the temperature of the steel bath, said refinement occurring under an inert atmosphere which is under a pressure greater than normal pressure;

(iv) performing vacuum degassing of the steel with a circulating vacuum degassing apparatus which imparts strong circulation during two-thirds of the treatment, and weak circulation during one-third of the treatment; and

(v) performing a reducing refinement on the steel by weakly agitating the smelted steel in a reducing atmosphere at normal pressure, said treatment thereby reducing the amounts of phosphorus, sulfur, aluminum, oxygen, nitrogen and titanium to not more than 0.01%, not more than 0.002%, not more than 0.015%, not more than 0.0006%, not more than 0.005% and not more than 0.0015% by weight respectively.

4,702,768

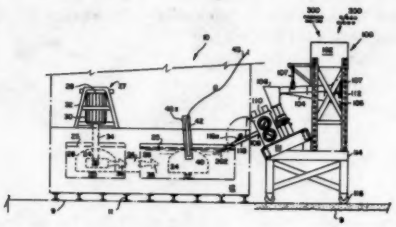
PROCESS AND APPARATUS FOR INTRODUCING METAL CHIPS INTO A MOLTEN METAL BATH THEREOF

Larry D. Areaux, Portage, and Robert H. Dudley, Richland, both of Mich., assignors to Pre-Melt Systems, Inc., Kalamazoo, Mich.

Filed Mar. 12, 1986, Ser. No. 839,112

Int. Cl.[4] C22B *9/18;* **F27B** *14/16*

U.S. Cl. 75—65 R **27 Claims**



1. A process for the industrial utilization of metal chips which involves the introduction of said metal chips into a mass of molten metal of which said chips are formed, comprising the steps of:

compacting and stripforming said metal chips into the form of a compacted metal strip,

introducing the said metal chips, now in stripform metal form, at a point of introduction directly into said mass of molten metal, and

causing said stripform metal to melt into and to become a part of said mass of molten metal below the surface thereof without essential disturbance of the surface thereof except at the point of introduction of said stripform metal charge through the surface thereof.

4,702,769

SINTERED ALLOY FOR DECORATION

Mikio Fukuhara, Tokyo, and Tetsuya Mitsuda, Kawasaki, both of Japan, assignors to Toshiba Tungaloy Co., Ltd., Japan

Filed Mar. 10, 1983, Ser. No. 474,813

Claims priority, application Japan, May 21, 1982, 57-86234; May 21, 1982, 57-86235

Int. Cl.[4] C22C *29/02, 29/12, 29/16*

U.S. Cl. 75—233 **8 Claims**

1. A sintered alloy for decoration which consists essentially of:

(A) 2 to 30% by weight of a binding phase comprising one or more elements selected from the group consisting of Fe, Ni, Co, Cr, Mo and W;

(B) 0 to 10% by weight of a strengthening phase comprising at least one material selected from the group consisting of metal, an alloy, a metal oxide, a metal nitride and a metal carbide;

(C) a hard phase represented by the formula:

$$(Ti_a, M_b)(N_w, C_x, O_y)_z$$

wherein M is one or more elements selected from the group consisting of Zr, Hf, V, Nb, Ta and Cr; a is a atomic ratio of Ti; b is an atomic ratio of a metal represented by M; $a+b=1$; $1 \geqq a \geqq 0.4$; $0.6 \geqq b \geqq 0$; N is nitrogen; C is carbon; O is oxygen; w, x and y are atomic ratios of nitrogen, carbon and oxygen, respectively; z is a ratio of nonmetallic elements with respect to the metals; $w+x+y=1$;

$x+y>0$; $1 \geq w \geq 0.4$; $0.15 \geq x \geq 0$; $0.6 \geq y \geq 0$; and $0.95 \geq z \geq 0.6$; and

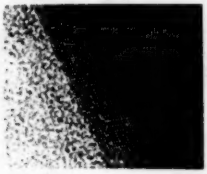
(D) inevitable impurities, wherein said colored sintered alloy (i) is the product of a sintering process that uses, as a starting material, a titanium compound which has a substoichiometric composition, such that nitrogen gas liberated during said sintering process nitrogenizes said titanium compound, and (ii) contains an amount of carbon, calculated with the sum of said strengthening phase and said hard phase taken as 100%, that is no greater than 4.2 atomic %.

4,702,770

MULTIPURPOSE BORON CARBIDE-ALUMINUM COMPOSITE AND ITS MANUFACTURE VIA THE CONTROL OF THE MICROSTRUCTURE

Aleksander J. Pyzik, and Ilhan A. Aksay, both of Seattle, Wash., assignors to Washington Research Foundation, Seattle, Wash.

Filed Jul. 26, 1985, Ser. No. 759,411
Int. Cl.[4] C22C *29/02*; B22F *3/26, 3/12*
U.S. Cl. 75—236 **37 Claims**



1. A method of making a boron carbidealuminum composite, comprising:

heating a particulate boron carbide in the presence of free carbon to 1800°–2250° C. wherein the resulting boron carbide exhibits a substantially reduced reaction rate with aluminum; and

reacting said boron carbide with aluminum, wherein a boron carbide-aluminum composite is formed having a microstructure including principally boron carbide and aluminum metal homogeneously distributed throughout said composite.

9. A method of making a boron carbide-aluminum composite of selected ceramic and metal content and microstructure, having high fracture toughness, fracture strength and Young's modulus, and low density, comprising;

dispersing a particulate boron carbide of less than 10 micrometers average particle size in water at a pH selected to maximize electrostatic repelling forces on boron carbide particle surfaces;

consolidating said boron carbide into a porous compact;

sintering said compact, whereby an open porous structure is retained;

infiltrating said compact with aluminum; and

heat treating said compact, whereby a voidless composite is formed having a plurality of microstructure phases.

4,702,771

WEAR-RESISTANT, SINTERED IRON ALLOY AND PROCESS FOR PRODUCING THE SAME

Yoshiaki Takagi, Tsurugashima; Yoshihiro Katsui, Tokyo; Hiroyuki Endo, Abiko, and Yutaka Ikenoue, Matsudo, all of Japan, assignors to Hitachi Powdered Metals Co., Ltd., Matsudo and Honda Giken Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Apr. 4, 1986, Ser. No. 848,062
Claims priority, application Japan, Apr. 17, 1985, 60-82035
Int. Cl.[4] C22C *29/02, 29/06*
U.S. Cl. 75—241 **14 Claims**

1. A wear-resistant, sintered iron alloy having a composition comprising, by weight: 1.8 to 4% or Cr, 0.1 to 1% of Mn, 0.07 to 1% of Mo, 0.06 to 1.5% of P, 1 to 10% of Cu or a Cu alloy, 1.5 to 4% of C and, as the balance, Fe; the structure of the alloy comprising an iron-based alloy matrix containing Cr, Mn and Mo therein, iron-based hard particles having a Cr content higher than that of the matrix and being dispersed as a hard alloy phase in said matrix, and copper or copper alloy particles which are dispersed in said matrix in a non-diffused state.

4,702,772

SINTERED ALLOY

Ulf F. I. Engström; Sven E. Allroth, and Olavi M. Mustonen, all of Höganäs, Sweden, assignors to Hoganas AB, Höganäs, Sweden

Filed Mar. 6, 1986, Ser. No. 836,855
Claims priority, application Sweden, Mar. 7, 1985, 8501102
Int. Cl.[4] C22C *29/00*
U.S. Cl. 75—243 **8 Claims**

1. Iron-base powder containing the elements nickel and molybdenum for producing high-strength sintered bodies, said powder consists essentially of iron, 7–12% by weight of nickel, 0.4–1.5% by weight of molybdenum, and 0.3–0.7% by weight of carbon; said powder further characterized by at most only including other alloying materials merely as naturally occurring impurities.

4,702,773

TRANSPARENT, ABRASION RESISTANT COATING COMPOSITIONS

Lysander T. Ashlock, Riverside; Harold Mukamal, Seal Beach, and William H. White, La Puente, all of Calif., assignors to Swedlow, Inc., Garden Grove, Calif.

Continuation of Ser. No. 364,446, Apr. 1, 1982, Pat. No. 4,571,365, which is a continuation-in-part of Ser. No. 136,757, Apr. 3, 1980, Pat. No. 4,500,669, which is a continuation of Ser. No. 845,915, Oct. 27, 1977, abandoned. This application Feb. 14, 1986, Ser. No. 829,745
Int. Cl.[4] C08K *3/8*; C08C *83/06*
U.S. Cl. 106—287.12 **37 Claims**

1. A coating composition which forms a transparent, abrasion-resistant coating upon curing, said coating composition containing an effective abrasion resisting amount of a colloidal dispersion of a water insoluble dispersant in a water-alcohol solution of the partial condensate of $R(Si(OH)_3)$ wherein R is an organic radical, and said dispersant is a metal salt wherein the metal is selected from the group consisting of antimony, aluminum, gold, silver, copper, tin, cadmium, indium and mixtures thereof.

4,702,774

ACTIVATOR FLUID FOR WATER REMOISTENABLE GLUE

Roger Spurgeon, 1735 Kingsway Dr., Xenia, Ohio 45385

Filed Jun. 16, 1986, Ser. No. 874,417
Int. Cl.[4] C09K *3/00*
U.S. Cl. 106—287.24 **5 Claims**

1. An activator fluid for a water remoistenable glue comprising from 0.4 to 0.12% acetic acid, from 0.20 to 0.60% fragrance, from 0.01 to 0.1% coloring, and the balance water, all percentages by volume.

4,702,775
PREPARATION OF MAGNETITE PIGMENTS: CONTROL OF PARTICLE SIZE

Werner Ostertag, Gruenstadt; Henning Wienand, Neulussheim, and Roland Bauer, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 25, 1986, Ser. No. 878,220

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1985, 3523317

Int. Cl.[4] C01G *49/08*; C03G *9/14*

U.S. Cl. 106—304 **2 Claims**

1. A process for the preparation of a magnetite pigment by adding an aqueous iron(II) salt solution to an aqueous solution of an alkali metal or alkaline earth metal hydroxide at pH 7 to 14 and from 60° to 100° C., in a precipitation stage, and oxidizing the iron hydroxide precipitate in a subsequent oxidation stage by passing in an oxygen-containing gas at from 60° to 100° C. until the Fe(II)/Fe(III) ratio reaches from 0.5 to 0.23, wherein, in a residence stage between the precipitation stage and the oxidation stage, the suspension is stirred for from 5 to 180 minutes while maintaining the pH and temperature.

4,702,776
PREPARATION OF PIGMENTARY RED IRON OXIDES

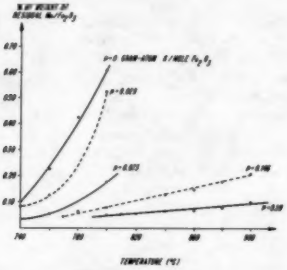
Daniel A. E. Hoffner, and Jean-Marie C. Trautmann, both of Thann, France, assignors to Thann et Mulhouse, Thann-Haut-Rhin, France

Filed Mar. 27, 1985, Ser. No. 716,540

Claims priority, application France, Mar. 27, 1984, 8405175

Int. Cl.[4] C09C *3/00*

U.S. Cl. 106—309 **23 Claims**



1. A process for the preparation of pigmentary red iron oxide, which comprises (1) calcining an intimate admixture of (i) a ferrous sulfate hydrate containing contaminating amounts of manganese value impurities and a sodium or potassium compound compound, at a temperature ranging from about 700° to 960° C., said admixture comprising from 0.08 to 1 gram-atom of alkali metal per mole of Fe_2O_3, and (2) washing said calcined admixture with water to remove essentially all water-soluble manganese values therefrom.

4,702,777
METHOD AND APPARATUS FOR HIGH CAPACITY WASHING, SANITIZING AND DRYING OF STACKS OF FLATS

Henry Y. Kuhl, Kuhl Rd., P.O. Box 26, Flemington, N.J. 08822

Filed May 27, 1986, Ser. No. 866,678

Int. Cl.[4] B08B *3/02, 3/04, 7/04*

U.S. Cl. 134—25.3 **22 Claims**

1. An apparatus for high capacity washing, sanitizing and drying of stacks of flats comprising:

(a) a housing means;

(b) a first processing station located within said housing means and defining a first processing chamber therein adapted to receive a stack of flats for processing therein;

(c) a second processing station located within said housing means and defining a second processing chamber therein adapted to receive a stack of flats for processing therein;

(d) a rotatably movable first table means positioned within said first processing station and adapted to receive a stack of flats positioned thereon;

(e) a rotatably movable second table means positioned within said second processing station and adapted to receive a stack of flats positioned thereon;

(f) a first drive means connected with respect to said first table means to selectively cause rotational movement thereof;

(g) a second drive means connected with respect to said second table means to selectively cause rotational movement thereof;

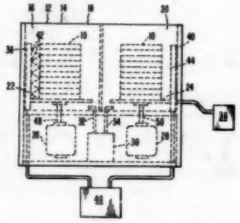
(h) a pump means in fluid flow communication with respect to said first processing chamber and said second processing chamber and adapted to pump cleaning solution therebetween;

(i) a first wash line in fluid flow communication with respect to said pump means and said first processing chamber;

(j) a second wash line in fluid flow communication with respect to said pump means and said second processing station;

(k) a cleaning solution source means in fluid flow communication with respect to said first processing chamber means to supply cleaning solution thereto;

(l) a first sanitizing spray conduit means positioned within said first processing chamber means and defining a plurality of



first aperture means therealong for selective dispensing of solutions therefrom upon stacks of flats positioned therein;

(m) a second sanitizing positioned within said second processing chamber means and defining a plurality of second aperture means therealong for selective dispensing of solutions therefrom upon stacks of flats positioned therein; and

(n) a sanitizing spray supply means selectively in fluid flow communication with respect to said first sanitizing conduit means spray conduit and said second sanitizing spray conduit.

13. A method for high capacity washing, sanitizing and drying of stacks of flats comprising:

(a) placing a first stack of flats to be cleaned into a first of two adjacently positioned processing chambers;

(b) removing of cleaning solution from the second of two adjacently positioned processing chambers;

(c) filling the first processing chamber with the cleaning solution removed from the second processing chamber;

(d) rotationally moving the first stack of flats within the first processing station for washing thereof;

(e) placing a second stack of flats to be cleaned into the second processing chamber;

(f) removing of cleaning solution from the first processing chamber;

(g) filling the second processing chamber with the cleaning solution removed from the first processing chamber;

(h) rotationally moving the second stack of flats within the second processing station for washing thereof;

(i) rotating the first stack of flats within the first processing station;

(j) rinsing the rotating first stack of flats with rinsing solution;
(k) drying the first stack of flats by rotation thereof within the first processing station;
(l) removing of the first stack of flats from the first processing station;
(m) placing a third stack of flats into the first processing station;
(n) removing of cleaning solution from the second processing station;
(o) filling of the first processing station with cleaning solution removed from the second processing station;
(p) rotating the second stack of flats within the second processing station;
(q) rinsing the rotating second stack of flats with rinsing solution;
(r) drying the second stack of flats by rotation thereof within the second processing station; and
(s) removal of the second stack of flats from the second processing station.

4,702,778

METHOD FOR SOFTENING ROLLED MEDIUM CARBON MACHINE STRUCTURAL STEELS

Toshihiko Takahashi; Toshimi Tarui, both of Sagamihara, and Hiroshi Sato, Kamaishi, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 22, 1986, Ser. No. 821,550
Claims priority, application Japan, Jan. 28, 1985, 60-13891
Int. Cl.[4] C21D *8/00*
U.S. Cl. 148—12 F **9 Claims**

1. A method of softening a rolled medium carbon machine structural steel, said method comprising:
(1) hot rolling a steel containing 0.32–0.65%C, less than 0.05% Si, 0.3–0.9% in total of Mn and Cr, with the Mn and Cr contents being 0.2–0.5% and 0.1–0.5%, respectively, 0.005–0.1% Al, less than 0.02% P and less than 0.02% S, all percents being on a weight basis, and the balance being Fe and incidental impurities, and
(2) slowly cooling the as-rolled steel at a cooling rate of 3°–30° C./min over the temperature range of from 750° C. to the point where transformation to pearlite is completed to thereby provide the rolled steel with a strength of not greater than $30+65\times C\%$ (kg/mm^2), C% signifying the carbon content of the steel.

4,702,779

HEAT PROCESS FOR PRODUCING CORROSION RESISTANT STEEL ARTICLES

Michel Madsac, Sceaux, and René Mauvoisin, Paris, both of France, assignors to L'Air Liquide, Paris, France

Filed Oct. 7, 1986, Ser. No. 916,186
Claims priority, application France, Oct. 8, 1985, 85 14849
Int. Cl.[4] C23C *8/24*
U.S. Cl. 148—16.6 **10 Claims**

1. A heat process for producing corrosion resistant steel articles, comprising a first step during which the articles placed in a furnace are nitrided in a gaseous atmosphere to produce on their surface a first layer consisting essentially of epsilon type iron nitride, followed by a second step during which the articles are exposed to an oxidizing atmosphere to form a second, oxide-rich layer on the surface of said articles, characterized in that during the first step, an atmosphere comprising 20 to 70% by volume of ammonia NH_3, 1 to 5% by volume of nitrous oxide N_2O and 25 to 79% by volume of nitrogen N_2 is introduced into the furnace, the concentration ratio of ammonia to nitrous oxide $[NH_3]/[N_2O]$ in the introduced atmosphere being greater than 5 so that the furnace atmosphere is not oxidizing, and in that during the second step an atmosphere comprising up to 25% by volume NH_3, up to 5% by volume N_2O and 70 to 100% by volume N_2 is introduced into the furnace, the concentration ratio of ammonia to nitrous oxide in the atmosphere introduced in the second step being such that $0<[NH_3]/[N_2O]<5$, the furnace atmosphere being renewed at a rate of 2 to 5 such that the atmosphere gradually becomes oxidizing, whereby steel articles are produced which comprise a core covered with a base layer of epsilon type iron nitride, and intermediate layer of iron oxinitride having a thickness of 2 to 12 microns and an outermost surface layer of iron oxide having a thickness of 1 to 7 microns.

4,702,780

PROCESS FOR PRODUCING A GRAIN ORIENTED SILICON STEEL SHEET EXCELLENT IN SURFACE PROPERTIES AND MAGNETIC CHARACTERISTICS

Yukio Inokuchi; Shigeko Ikeda, and Yoh Ito, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

PCT No. PCT/JP84/00599, § 371 Date Jan. 15, 1985, § 102(e) Date Jan. 15, 1985
PCT Filed Dec. 14, 1984, Ser. No. 695,456
Claims priority, application Japan, Jun. 20, 1983, 58-109177
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—111 **1 Claim**

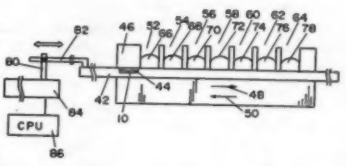
1. A process for manufacturing a grain oriented silicon steel sheet being excellent in the surface properties and magnetic characteristics, which is characterized by steps of: heat treating a raw slab for a silicon steel sheet which raw slab has a composition containing 0.01–0.08% of C, 3.1–4.5% of Si, 0.005–0.06% of sol Al, 0.003–0.1% of Mo and 0.005–0.1% in total amount of one or two kinds of S and Se at heating temperature of not lower than 1,270° C. such that the scale loss may be 2.7–5.0%, and then hot rolling the heat treated steel; continuously annealing the hot rolled steel at a temperature range of 950°–1,200° C. prior to a final cold rolling, followed by quenching; subjecting the quenched steel to the cold rolling at a draft of 80–95% including a warm rolling at a temperature range of 250°–400° C. to obtain a final sheet thickness; and performing a finish annealing including a primary recrystallization annealing also serving as decarburization and a secondary recrystallization.

4,702,781

LIQUID PHASE EPITAXIAL GROWTH METHOD

Yoichi Sasai, Hirakata, and Minoru Kubo, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 15, 1985, Ser. No. 787,369
Claims priority, application Japan, Oct. 16, 1984, 59-216654
Int. Cl.[4] H01L *21/208*
U.S. Cl. 437—129 **14 Claims**



1. In a liquid phase epitaxial growth method using a substrate holding member for holding a substrate on which an epitaxial growth layer is formed, and a solution holding member which holds solution for use in epitaxial growth, the improvement comprising:
sliding one of a substrate holding member and a solution holding member against the other thereof at a predetermined constant speed; and
forming an epitaxial growth layer having a thickness of less than 500 Å on a substrate by contacting the surface of said substrate with a solution in said solution holding member under such conditions that one of said members is sliding

against the other, without stopping the sliding movement of one of said members,

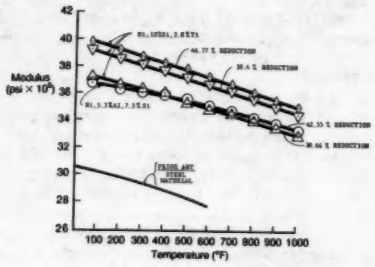
whereby the thickness of said epitaxial growth layer is controlled by the sliding speed of one of said members.

4,702,782

HIGH MODULUS SHAFTS

Herbert A. Chin, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 24, 1986, Ser. No. 934,972
Int. Cl.[4] C22F 1/10
U.S. Cl. 148—429 6 Claims



1. An article which comprises: a nickel base alloy containing more than about 50 volume percent of a strengthening phase of the $Ni_3(Si+X)$, said article having a <111> texture which is at least five times random along a particular axis and a high modulus of elasticity along the same axis.

4,702,783

ADHESIVE TECHNOLOGY

William H. Mason, III, St. Paul, Minn., assignor to Uncommon Conglomerates, Inc., Minneapolis, Minn.

Filed Oct. 25, 1982, Ser. No. 436,197
Int. Cl.[4] B32B 31/00
U.S. Cl. 156—64 17 Claims

1. A process for quickly and removably fastening a screen fabric material to a frame structure for serigraphic printing use, said process utilizing a cyanoacrylate based adhesive to secure the screen fabric to the frame structure with a bond having a high shear strength resistance and a low peel strength, said process comprising the following steps in the sequence set forth:

(a) providing a meshed screen fabric material being essentially in taut and touching communication with the peripheral surface of a frame structure,

(b) applying a cyanoacrylate based adhesive to said screen fabric portions in communication with said frame structure to contact the adhesive with the frame structure through the mesh of the screen fabric, said cyanoacrylate based adhesive being selected from a group consisting essentially of methylcyanoacrylate, ethylcyanoacrylate and isopropylcyanoacrylate, said cyanoacrylate based adhesive further having a colored dye therein to aid a user in the proper application of the adhesive, and,

(c) spraying a chemically basic catalyst to said cyanoacrylate based adhesive applied to said frame structure through the screen fabric mesh, said basic catalyst accelerating the anionic polymerization of said cyanoacrylate adhesive, said chemically basic catalyst further being an aromatic amine.

4,702,784

PROCESS FOR PRODUCTION OF A TUNGSTEN CARBIDE-ACTIVATED ELECTRODE

Aristides Naoumidis; Herbert Neumeister, both of Julich; Arno Schirbach, Eschweiler; Bernd D. Struck, Langerwehe, and Dieter Triefenbach, Julich, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrnakter Haftung, Julich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 502,478, Jun. 9, 1983, abandoned. This application Jun. 5, 1985, Ser. No. 741,637
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1982, 3222436
Int. Cl.[4] C25B 1/22, 11/12
U.S. Cl. 156—89 16 Claims

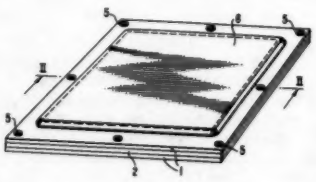
1. In a process for production of a tungsten carbide-activated electrode used for acid electrolysis, which consists essentially of an electrically-conductive substrate comprising graphite or a graphite-like material, said substrate having a surface active layer of tungsten carbide; the improvement comprising applying tungsten oxide or a compound which is thermally decomposable into tungsten oxide onto the surface of said substrate, converting said tungsten compound through thermal decomposition into tungsten oxide followed by reduction on said substrate to form tungsten carbide, including thermal treatment at temperatures of up to 950° C. in a CO/CO_2 environment, and as such bonding said tungsten carbide with said substrate.

4,702,785

PROCESS FOR MANUFACTURING MULTILAYER PC BOARDS

Rainer Burger, Niederkassel-Ranzel, Fed. Rep. of Germany, assignor to President Engineering Corporation, Zurich, Switzerland

Filed Jun. 24, 1985, Ser. No. 748,042
Int. Cl.[4] B32B 31/16, 7/04
U.S. Cl. 156—91 16 Claims



1. A process for the manufacture of multilayer printed circuit boards having conductive patterns located in at least three planes, comprising:

assembling at least one stack of at least two laminate layers each of which is separated from each adjacent laminate layer by at least one prepreg to form a stack having a maximum thickness in a direction perpendicular to said planes, said laminate layers each having means disposed in an area thereof for aligning said laminate layers with respect to each other;

securing said stack of laminate layers and said at least one prepreg together with fastening means located in said area of each adjacent laminate layer, said fastening means extending a distance in said direction which is less than said thickness of said stack; and

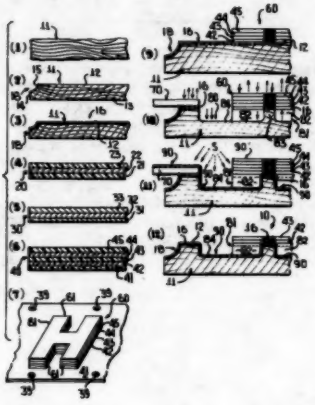
curing said stack of laminate layers and said at least one prepreg by application of heat and pressure thereto.

4,702,786

SIGN SANDBLASTING METHOD

Gary C. Tallman, P.O. Box 4, Whitefish, Mont. 59937

Filed Oct. 1, 1986, Ser. No. 914,180
Int. Cl.[4] B32B *31/12, 31/22;* B44C *1/18;* G09F *7/12*
U.S. Cl. 156—154 32 Claims



1. A method of manufacturing an article comprising the steps of providing a substrate having an upper surface; providing a laminate having a peripheral edge of a predetermined profile and including a first ply adapted to become a part of the article and a second ply adapted to protect the first ply during the manufacture of the article; the predetermined profile of the laminate being defined by generally coextensive edges of the first and second plies, securing the first ply to the upper surface of the substrate; directing abrasive material against the second ply and an exposed surface portion of the substrate upper surface whereby the second ply protects the underlying first ply from the abrasive material and the abrasive material removes an upper surface strata of the substrate exposed surface portion without affecting the upper surface strata underlying the first ply, and removing the second ply from the first ply whereby the article includes the first ply in coextensive overlying relationship to the underlying upper surface strata of the substrate.

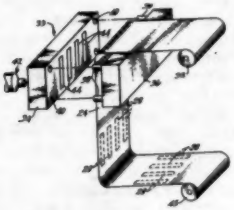
4,702,787

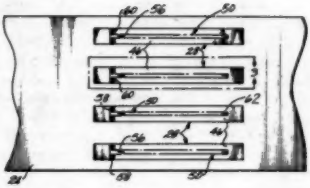
PROCESS FOR MAKING DRIP IRRIGATION LINES

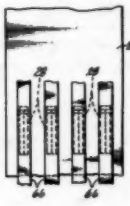
Rodney Ruskin, San Francisco, and Rael Sacks, Fresno, both of Calif., assignors to Agrifim Irrigation International NV, Curacao, Netherlands Antilles

Filed Jun. 10, 1983, Ser. No. 503,275
Int. Cl.[4] B29C *45/16*
U.S. Cl. 156—244.25 32 Claims

1. A method for making an emitter-type drip irrigation line comprising forming a molded dripper element by injection molding onto a face of a flat, flexible sheet a thin, flat base layer of moldable material having an elongated flow-restricting passage injection molded in a face of said base layer opposite from the flexible sheet, the moldable material being in a molten state during the injection molding step so that heat from the molten material heat bonds the base layer directly to the face of the flat, flexible sheet, the flow-restricting passage being molded in a depthwise portion of said base layer so that the flow-restricting passage faces away from the flexible sheet and is separated from the flexible sheet by a depthwise portion of the base layer which is bonded to the flat, flexible sheet; allowing the injection molded dripper element to harden; sealing the injection molded flow-restricting passage on a side of said base layer which faces away from the flexible sheet for forming a sealed internal pressure-reducing emitter chamber in the molded dripper element; and forming a drip irrigation supply tube from said flexible sheet wherein an inlet to the sealed







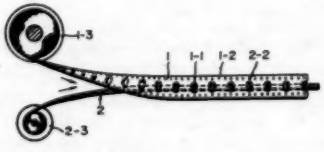
emitter chamber communicates with the interior of the supply tube and an outlet from the sealed chamber is exterior to the supply tube.

4,702,788

METHOD OF RECEIVING SMALL-SIZED ELECTRONIC PARTS

Tokujiro Okui, Toyonaka, Japan, assignor to Uzo Tomii, Japan

Continuation-in-part of Ser. No. 518,544, Jul. 29, 1983, abandoned. This application Apr. 17, 1986, Ser. No. 853,211
Claims priority, application Japan, Feb. 28, 1983, 58-33635
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—252 12 Claims



1. A process for packaging electronic parts comprising:
providing an elongated strip of flexible material, said strip having a surface and a length, said material having a physical characteristic of conducting electricity to an extent necessary to prevent attachment of electronic parts to the surface of said strip by static electricity,
punching a series of aligned holes in said strip, said holes

being aligned in rows along the length of the elongated strip,

adhesively bonding one side of a double-sided adhesive strip to one side of the elongated strip over one row of said series of holes, a first portion of said adhesive strip being visible through each hole and a second portion of said adhesive strip not being visible through said holes, each said hole in said one row having a width perpendicular to the length of the elongated strip,

bonding a strip of release paper to the other side of the double-sided adhesive strip, said strip of release paper being of a width at least as great as the adhesive strip, said strip of release paper having two sides with (1) one side being in contact with the adhesive strip and (2) the other side not contacting the adhesive strip,

inserting an electronic part into each of at least some of the holes of said one row and into contact with said first portion and adhesively bonding said parts to the first portions of said adhesive strip which are exposed through said one row of holes,

each said first portion of said adhesive strip having a physical characteristic of releasing from said strip of release paper and from the second portion of said adhesive strip which is not exposed through said one row of holes while remaining bonded to said part in which said portion is in contact when force is applied to remove said part from said hole, and

while leaving the holes in said one row unobstructed from one side of the elongated strip rolling the elongated strip, electronic parts, adhesive strip and release paper into a coil in a direction, the direction of rolling being along the aligned row of holes whereby the other side of the release paper covers said unobstructed holes.

7. A process for packaging electronic parts, storing said electronic parts and subsequently using at least one of said parts, said process comprising;

providing an elongated strip of flexible material, said strip having a surface and a length, said material having a physical characteristic of conducting electricity to an extent necessary to prevent attachment of electronic parts to the surface of said strip by static electricity,

punching a series of aligned holes in said strip, said holes being aligned in rows along the length of the elongated strip,

adhesively bonding one side of a double-sided adhesive strip to one side of the elongated strip over one row of said series of holes, a first portion of said adhesive strip being visible through each hole and a second portion of said adhesive strip not being visible through said holes, each said hole in said one row having a width perpendicular to the length of the elongated strip, the width of said adhesive strip being less than the width of each said hole,

bonding a strip of release paper to the other side of the double-sided adhesive strip, said strip of release paper being of a width at least as great as the adhesive strip, said strip of release paper having two sides with (1) one side being in contact with the adhesive strip and (2) the other side not contacting the adhesive strip,

inserting an electronic part into each of at least some of the hole of said one row and into contact with said first portion and adhesively bonding said parts to the first portions of said adhesive strip which are exposed through said one row of holes,

each said first portion of said adhesive strip having a physical characteristic of releasing from said strip of release paper and from the second portion of said adhesive strip which is not exposed through said one row of holes while remaining bonded to said part in which said portion is in contact when force is applied to remove said part from said hole,

while leaving the holes in said one row unobstructed from one side of the elongated strip rolling the elongated strip, electronic parts, adhesive strip and release paper into a coil in a direction the direction of rolling being along the aligned row of holes whereby the other side of the release paper covers said unobstructed holes; and

removing at least one electronic part from the hole where it was previously inserted by application of a vacuum and the part so removed is then bonded to a component of electronic equipment solely by the adhesive on the part which separated from the release strip with the part when said part was removed from the hole.

4,702,789

METHOD FOR APPLYING A PORTION OF A PHOTOSENSITIVE FILM TO AT LEAST ONE FACE OF A FLAT PLATE HAVING A SURFACE AREA GREATER THAN SAID PORTION

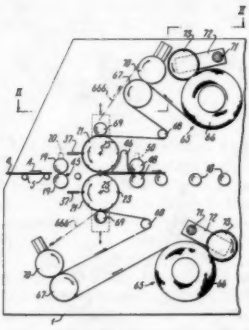
Arcangelo B. Ceraso, Milan, Italy, assignor to Morton Thiokol, Inc., Chicago, Ill.

Division of Ser. No. 450,476, Dec. 16, 1982, Pat. No. 4,650,536. This application Sep. 26, 1986, Ser. No. 912,440

Claims priority, application Italy, Feb. 10, 1982, 46808 A/82

Int. Cl.[4] B32B *31/18*

U.S. Cl. 156—256 **20 Claims**



1. A method of applying a photosensitive film portion to at least one face of each of a succession of support members each of which has front, side, and rear edges such that the support member face extends beyond the film portion at each of the edges whereby the film portion perimeter lies within the profile of the support member face, the method comprises the steps of:

a. supplying film having a leading edge to at least one of a pair of opposing cylindrical surfaces,

b. cutting the film to a predetermined film width less than the respective support member width while it is being supplied to the at least one cylindrical surface,

c. inserting a support member between the pair of cylindrical surfaces,

d. rotating the at least one cylindrical surface a predetermined amount to position the film leading edge between the at least one cylindrical surface and the support member,

e. positioning the support member such that its front edge extends beyond the film leading edge by a predetermined distance and with each of the support member sides extending beyond the respective film sides by a predetermined distance,

f. attaching the film leading edge to the support member,

g. cutting from the film a film portion having a predetermined length less than the support member length by a predetermined amount greater than the predetermined distance the support member front edge extends beyond the film leading edge while the film portion is disposed on the at least one cylindrical surface,

h. fixing the film portion to the support member, and

i. repeating steps b through h for each of the succeeding support members.

4,702,790

FUEL FILTER APPARATUS AND THE METHOD OF MANUFACTURE

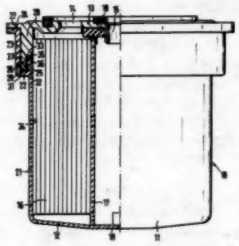
Josef Hogh, Waiblingen, and Hans Schacht, Stuttgart, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 14, 1985, Ser. No. 734,387

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1984, 3425347

Int. Cl.[4] B01D *27/04*

U.S. Cl. 156—293 5 Claims



1. A filter for filtering fuels, comprising a cup-shaped housing; a cover closing said housing; a wound filter element accomodated in said housing; and glue-receiving means separating a contaminated side in said housing from a clean side and receiving glue for connecting said housing and said cover to each other and to said filter element, said housing and said cover being both formed of plastics, said glue-receiving means being ring-shaped, said housing having, at an inner side thereof, in the region of said glue-receiving means an extension which forms an annular pocket which is open to said cover, said cover being formed with a collar conforming to and extending into said pocket and partially filling said pocket, said filter element having a peripheral surface, said collar together with said extension forming an annular gap limited at said peripheral surface, said annular gap forming said glue-receiving means; said housing and said cover in the region of said glue-receiving means abutting against said peripheral surface and limiting together with the same said annular gap, said gap having at least one axially extending portion in said pocket and a radially extending portion which leads to said peripheral surface, said axially extending portion merging into said radially extending portion so that said housing, said cover, said filter element and said annular gap when filled with glue form an entire sealed assembly in the region of said glue-receiving means.

5. A method of manufacturing a fuel filter including a plastic housing having a cover, a wound filter element accommodated in the housing and glue-receiving means for receiving means for receiving glue for connecting the housing and the cover to each other and to the filter element, and wherein one of said housing and the cover has a pocket and another of said housing and the cover has a collar, the method comprising the steps of inserting the wound filter element into one of said housing and the cover, filling said pocket at least partially with flowable glue, mounting the other of said housing and the cover on the one of said housing and the cover so that said collar is partially inserted into said pocket and displaces the glue therefrom whereby an annular gap is formed betweeen said housing and said cover, in which the glue is received so that after solidifying of the glue, said housing and the cover and said filter element are rigidly and tightly connected to each other and form together with said annular gap when filled with glue an entire sealed assembly in the region of said glue-receiving means.

4,702,791

METHOD FOR MANUFACTURING BISMUTH-CONTAINING OXIDE SINGLE CRYSTAL

Yoshinori Mimura, Wako, and Yasuyuki Nagao, Yokohama, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1986, Ser. No. 879,905

Claims priority, application Japan, Jul. 16, 1985, 60-155232

Int. Cl.[4] C30B *25/00*

U.S. Cl. 156—614 7 Claims

1. A method for manufacturing a single crystal of an oxide containing bismuth and other metal, comprising introducing bismuth vapor or alkylated bismuth vapor and vapor of an organic compound of the other metal into a heated reaction chamber containing a substrate suitable for growing said single crystal of said oxide containing bismuth and other metal and reacting the bismuth or alkylated bismuth and organic compound of the other metal with oxygen, thereby depositing a single crystal of a bismuth-containing oxide of high purity on the substrate.

4,702,792

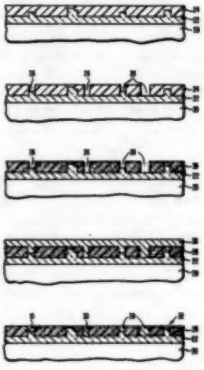
METHOD OF FORMING FINE CONDUCTIVE LINES, PATTERNS AND CONNECTORS

Ming-Fea Chow, Poughquagh; William L. Guthrie, Hopewell Junction, and Frank B. Kaufman, Amawalk, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1985, Ser. No. 791,862

Int. Cl.[4] C23F *1/00;* H05K *3/26;* H01L *71/84*

U.S. Cl. 156—628 16 Claims



1. A method of forming fine conductive lines, patterns, and connections, comprising the steps of:

(a) applying a polymeric material to a substrate;

(b) patterning said polymeric material to form openings through, spaces within, or combinations thereof within said polymeric material;

(c) applying conductive material to said polymeric material, thereby at least filling said openings and spaces existing within said polymeric material; and

(d) removing at least excess conductive material from the major exterior surface of said polymeric material using chemical-mechanical polishing means.

4. The method of forming fine lines, patterns, and connections, comprising the steps of:

(a) applying a polymeric photoresist to the surface of a substrate;

(b) patterning said photoresist to form openings through, spaces within, or combinations thereof in said photoresist;

(c) treating said photoresist with an organometallic compound, so that said organometallic compound is incorpo-

rated into at least the portions of said photoresist near the contact surface between said photoresist and said organometallic compound;

(d) applying a conductive material to said treated photoresist, so the openings in said treated photoresist are at least filled with said conductive material; and

(e) removing at least excess conductive material from the exterior major surface of said photoresist, using chemical-mechanical polishing means.

4,702,793

METHOD FOR MANUFACTURING A LAMINATED LAYERED PRINTED WIRING BOARD USING A SULFUROXY ACID AND AN OXIDING TREATMENT OF THE METALLIC WIRING PATTERNS TO INSURE THE INTEGRITY OF THE LAMINATE PRODUCT

Greg D. Garlough, Vadnais Heights, and Kurt E. Heikkila, Shoreview, both of Minn., assignors to ETD Technology Inc., Shoreview, Minn.

Continuation-in-part of Ser. No. 839,118, Mar. 12, 1986, abandoned. This application Jun. 2, 1986, Ser. No. 870,317

Int. Cl.⁴ B44C *1/22*

U.S. Cl. 156—629 **13 Claims**

1. A method for the manufacture of laminated or layered printed wiring boards that resist delamination caused by an interaction between a metal pattern and a printed wiring board substrate during manufacture and use which comprises:

(a) preparing a metallic foil printed circuit pattern;

(b) contacting at least one surface of the metallic printed circuit pattern with an aqueous solution of an effective concentration of a sulfuroxy acid compound to promote the rapid formation of a uniform metal oxide coating, forming a sulfuroxy acid treated metal pattern;

(c) contacting the sulfuroxy acid treated metal pattern with an effective amount of an aqueous oxiding agent to form a uniform metal oxide conversion coating on the metallic wiring pattern; and

(d) laminating the metallic pattern with the metal oxide coating with at least one substrate layer.

4,702,794

PRODUCTION OF THIN FILM MAGNETIC HEAD

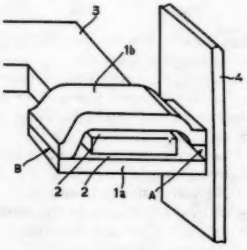
Tsuneo Nakamura, Nara; Hidenori Yamasaki, Yamatokoriyama; Tohru Kira, Tenri, and Mitsuhiko Yoshikawa, Ikoma, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 30, 1986, Ser. No. 824,199

Claims priority, application Japan, Jan. 31, 1985, 60-18879

Int. Cl.⁴ B44C *1/22*

U.S. Cl. 156—643 **3 Claims**



1. A method for preparing a back core of a thin film magnetic head used for high density recording inclusive of a magnetic core and an electroconductive coil, said magnetic core including an upper magnetic core and a lower magnetic core, said cores being assembled in a facial relationship providing a space therebetween for insertion therein of an electroconductive coil such that an inner surface of said upper core faces an inner surface of said lower core, each inner surface of said respective cores having an insulation layer coated thereon, said cores being magnetically connected at first ends thereof to form a back core, with second ends thereof forming a gap therebetween for addressing a magnetic tape or magnetic disc said method comprising:

providing a lower magnetic core material comprising a Fe-Al-Si alloy having coated on an inner surface thereof an insulation coating,

selectively etching said coated inner surface at a first end of said lower magnetic core material, where a back core connection is to be formed with said upper core material, by a reactive ion etching (RIE) method utilizing a fluorohydrocarbon gas such that said insulation material is selectively removed down to said inner surface of said core material thereby forming a reaction product on said etched surface,

allowing said etched core material to stand in a gas plasma selected from the group consisting of oxygen gas, a gas mixture of oxygen and argon and a mixture of oxygen with a fluorohydrocarbon gas thereby rendering said reaction product water soluble, and

washing said etched surface of said lower magnetic core material with water so as to remove said reaction product.

4,702,795

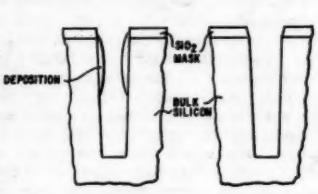
TRENCH ETCH PROCESS

Monte A. Douglas, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 3, 1985, Ser. No. 730,701

Int. Cl.⁴ H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **16 Claims**



1. A process for etching trenches in silicon, comprising the steps of:

providing a patterned mask over a silicon substrate;

plasma etching exposed portions of said silicon substrate under etch conditions such that the material of said mask is forward sputtered to induce deposition on sidewalls of said trench during etching.

4,702,796

METHOD FOR FABRICTING A SEMICONDUCTOR DEVICE

Masayuki Nakajima; Shinichi Sato; Akira Tokui; Akira Kawai; Masao Nagatomo, and Hiroji Ozaki, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1986, Ser. No. 931,583

Claims priority, application Japan, Dec. 16, 1985, 60-284630; Dec. 18, 1985, 60-285162

Int. Cl.⁴ H01L *21/04, 21/22, 21/306*; B44C *1/22*

U.S. Cl. 156—653 **10 Claims**

1. A method for fabricating a semiconductor device wherein a high density region (9) of a first conductivity type having higher density than that of a semiconductor substrate (1) is formed to surround a region (7) of a second conductivity type formed on said semiconductor substrate (1) of a first conductivity type, comprising the steps of

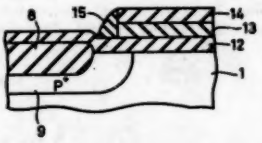
forming a first insulating film (12) on said semiconductor substrate (1) of the first conductivity type,

forming an impurity diffused region by selectively diffusing

an impurity of the first conductivity type using mask patterns (13, 14) against thermal oxidation,

depositing a second insulating film on said first insulating film (12) and said mask patterns (13, 14) and thereafter performing anisotropic etching to leave said second insulating film (15) only at a step portion of said first insulating film (12),

performing thermal oxidation using said left second insulating film (15) as a mask and said first insulating film (12) as nuclei to form an element separating insulating film (8)



and extending said impurity diffused region to form a high density region (9),

removing said first and second insulating films (12, 15) to form a gate electrode (3) on said semiconductor substrate (1) with a gate insulating film (4) interposed therebetween, and

forming regions (6, 7) of the second conductivity type by selectively implanting and diffusing impurity of the second conductivity type using said gate insulating film (4) and the element separating insulating film (8) as masks.

4,702,797

METHOD OF MANUFACTURING SEMICONDUCTOR MEMORY DEVICE

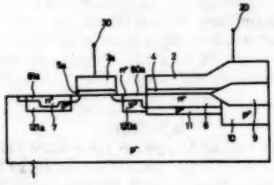
Hiroki Shimano; Masahiro Shimizu; Katsuhiro Tsukamoto, and Masahide Inuishi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1986, Ser. No. 943,053

Claims priority, application Japan, Dec. 20, 1985, 60-288207

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—653 . **8 Claims**



1. A method of manufacturing a semiconductor memory device comprising the steps of:

preparing a semiconductor substrate of a first conductivity type;

forming a memory cell portion including a charge storage region of a second conductivity type on said semiconductor substrate;

forming an insulator film on the region on said semiconductor substrate where a transfer gate transistor is to be defined for reading out charges from said charge storage region;

forming a polysilicon film on said insulator film;

forming a resist film pattern in a predetermined portion on said polysilicon film;

selectively etching said polysilicon film and said insulator film utilizing said resist film pattern as a mask, to form a gate insulator film on said semiconductor substrate and to form a gate electrode on said gate insulator film;

ion-implanting impurities of the first conductivity type from the exposed surface of said semiconductor substrate utilizing said resist film pattern as a mask, to form first and second semiconductor regions of the first conductivity type having higher impurity concentration than that of said semiconductor substrate, on the portions of said semiconductor substrates on one and the other sides of said gate electrode, respectively;

etching the side walls of said gate electrode and said gate insulator film so that they are located inside the side wall of said resist film;

removing said resist film pattern;

ion-implanting impurities of the second conductivity type from the surfaces of said first and second semiconductor regions and the exposed surface of said semiconductor substrate utilizing said gate electrode as a mask, to form a third semiconductor region of the second conductivity type serving as one source/drain region on said first semiconductor region and said semiconductor substrate on one side of said gate electrode so that it may be connected to said charge storage region and it may be shallower than said first semiconductor region, and to form a fourth semiconductor region of the second conductivity type serving as the other source/drain region on said second semiconductor region and said semiconductor substrate on the other side of said gate electrode so that it may be shallower than said second semiconductor region;

heat-treating said first, second, third and fourth semiconductor regions so that these regions are activated and diffused; and

interconnecting a bit line so that it may be connected to said fourth semiconductor region.

4,702,798

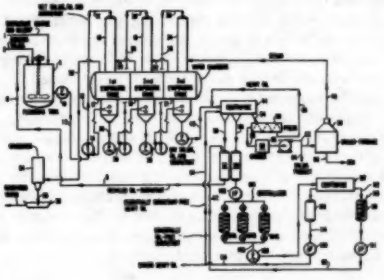
PROCESS FOR RECOVERING DRY SOLIDS FROM AQUEOUS SOLIDS MIXTURES

Anthony J. Bonanno, Parsippany, N.J., assignor to Hanover Research Corporation, East Hanover, N.J.

Continuation of Ser. No. 683,719, Dec. 19, 1984, abandoned. This application Feb. 24, 1987, Ser. No. 17,720

Int. Cl.[4] B01D *1/26*

U.S. Cl. 159—47.1 **12 Claims**



1. A continuous process for dehydrating aqueous solids, that process comprising the steps of:

(1) mixing aqueous solids with a fluidizing oil and an oil-soluble surfactant having a Hydrophilic-Lipophilic Balance number in the range 8 to 17;

(2) subjecting the resultant oil, surfactant and aqueous solids mixture to dehydration by heat in an evaporator having an evaporating surface with which said mixture comes in contact to be heated indirectly therethrough whereby substantially all of the water component of the mixture from said aqueous solids is vaporized to water vapor;

(3) removing said water vapor;

(4) separating the resultant anhydrous solids from the fluidizing oil and surfactant as product, and

(5) recycling said fluidizing oil and surfactant and mixing

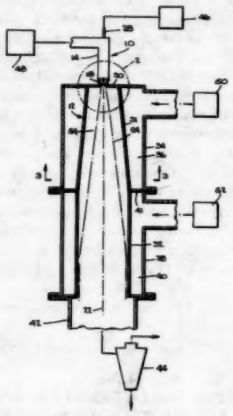
them with new aqueous solids to be dehydrated, and by the whole course of the process substantially preventing corrosion and scaling and clogging in the evaporator.

4,702,799

DRYER AND DRYING METHOD

James Tuot, Dublin, Ohio, assignor to Nestec S.A., Vevey, Switzerland

Filed Sep. 3, 1985, Ser. No. 772,150
Int. Cl.[4] B01D *1/14*
U.S. Cl. 159—48.1 **23 Claims**



1. A method of drying a liquid material comprising the steps of:

(a) atomizing the material and projecting a stream of the atomized material in a downstream direction; and

(b) contacting the atomized material with a drying gas by projecting the drying gas in turbulent flow, transversely to said down-stream direction, towards the stream from opposite sides thereof, the drying gas being distributed along the length of the stream so that the atomized material passes between opposing inward flows of drying gas, whereby the drying gas mixes with the atomized material and the atomized material dries as it moves downstream.

17. Apparatus for drying a liquid material comprising:

(a) means for atomizing the material and projecting a stream of the atomized material in a downstream direction; and

(b) means for projecting a drying gas in turbulent flow, transversely to said downstream direction, towards the stream from opposite sides thereof so that the drying gas is distributed along the length of the stream and the drying gas mixes with the atomized material.

4,702,800

HORIZONTAL TWIN WIRE PAPER MACHINE

Richard W. Creagan, Kirland, Canada, assignor to The Black Clawson Company, Middletown, Ohio

Filed Nov. 26, 1986, Ser. No. 935,446
Int. Cl.[4] D21F *1/00, 7/00*
U.S. Cl. 162—300 **7 Claims**

1. Apparatus for testing the combination of a top forming wire with a Fourdrinier paper machine in combination with a Fourdrinier paper machine including a main frame whereon are mounted means supporting a substantially horizontal run of a primary endless forming wire of predetermined width amd length, and headbox means for delivering a flow of paper making stock to the full width of said wire run for drainage therethrough to form a paper sheet thereon, comprising:

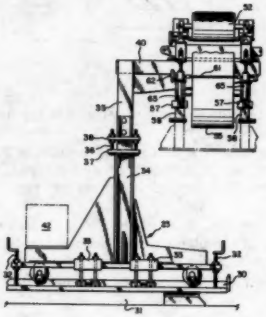
(a) means defining a supplemental frame of substantially shorter length and width than said wire run,

(b) stand means including cantilevered arm means for supporting said supplemental frame adjacent one side of said main frame with said arm means in overlying relation with said primary wire run,

(c) means for securing said supplemental frame to said arm means in overlying a portion of said primary wire run,

(d) means including two rolls mounted adjacent opposite ends of said supplemental frame supporting a second endless forming wire of substantially less width than said primary wire with a substantially horizontal run of said second wire overlying said primary wire run,

(e) means for effecting vertical adjustment of each of said



two rolls on said supplemental frame to establish a desired vertical relation between each end of said second wire run and said primary wire run,

(f) deflector means carried by said supplemental frame in supporting relation with said second wire run between said rolls for maintaining said second wire run in pressure relation with the stock on said primary wire run while scraping liquid from the inner surface of said second wire run, and

(g) saveall means mounted on said supplemental frame for receiving and collecting liquid from said deflector means,

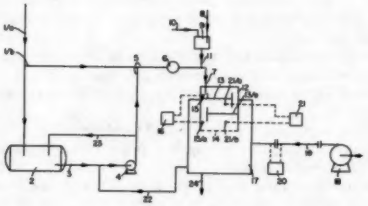
(h) whereby the sheet formed on said machine includes an integral portion formed by drainage through both of said wire runs while the remainder thereof is formed by drainage through only said primary wire.

4,702,801

PROCESS AND APPARATUS FOR THE DETERMINATION OF COLUMN TRAY EFFICIENCY

László Gyökhegyi, Mányoki út 5, 1118 Budapest, Hungary

Filed Mar. 7, 1983, Ser. No. 472,801
Int. Cl.[4] B01D *3/42*
U.S. Cl. 203—1 **19 Claims**



1. A process for the determination of the efficiency of trays of essentially same geometry and/or load in distillation col-

umns of given theoretical tray numbers and establishing the actual number of trays needed, which comprises:

(a) providing a test apparatus having a set of at least two distillation trays having upper and lower trays of essentially the same geometry and a distillation tray for distributing vapor or gas positioned below said lower tray;

(b) introducing a test liquid into said upper tray of said test apparatus;

(c) introducing a gas or vapor into the bottom of said test apparatus whereby said gas or vapor passes through the distillation tray distributing said gas or vapor and upwardly through said descending test liquid;

(d) measuring the residence time spectrum of test liquid introduced into at least one of said trays of said set of trays;

(e) calculating the efficiency of said trays from said measured residence time spectrum; and

(f) determining the actual number of trays needed for said column from said calculated efficiency.

4,702,802

METHOD FOR MAKING HIGH CORROSION RESISTANCE COMPOSITE PLATED STEEL STRIP

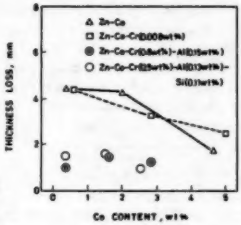
Shigeru Umino; Koji Yamato; Hajime Kimura, and Toshio Ichida, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Division of Ser. No. 741,824, Jun. 6, 1985, Pat. No. 4,650,724. This application Jul. 9, 1986, Ser. No. 884,182

Claims priority, application Japan, Nov. 28, 1984, 59-250707; May 25, 1985, 60-112490

Int. Cl.[4] C25D *3/56*

U.S. Cl. 204—28 **6 Claims**



1. In a method for preparing a high corrosion resistance composite plated steel strip, comprising

subjecting a steel strip to composite electroplating in an acidic zinc plating bath;

the improvement in which the bath also contains at least one water-soluble compound of Co^{2+} in an amount of 0.3 to 60 g/l of metallic cobalt,

at least one water-soluble compound of Cr^{3+} in an amount of 0.3 to 2.5 g/l of metallic chromium, and

a pseudo-boehmite alumina sol in an amount of 0.5 to 20 g/l of alumina.

4. In a method for preparing a high corrosion resistance composite plated steel strip, comprising

subjecting a steel strip to composite electroplating in an acidic zinc plating bath;

the improvement in which the bath also contains at least one water-soluble compound of Co^{2+} in an amount of 0.3 to 60 g/l of metallic cobalt,

at least one water-soluble compound of Cr^{3+} in an amount of 0.2 to 2.5 g/l of metallic chromium,

a pseudo-boehmite alumina sol in an amount of 0.5 to 20 g/l of alumina, and

colloidal silica in an amount of 0.5 to 20 g/l of silica.

4,702,803

PREPARATION OF PYRAZOLES

Michael Steiniger, Neustadt, and Eckhard Stroefer, Mannheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

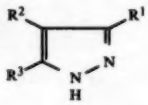
Filed Jan. 20, 1987, Ser. No. 4,971

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1986, 3603376

Int. Cl.[4] C25B *3/02*

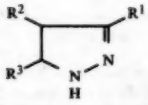
U.S. Cl. 204—59 R **10 Claims**

1. A process for preparing a pyrazole of the general formula



I

where R^1, R^2 and R^3 are each hydrogen, alkyl, cycloalkyl or aryl, which comprises electrochemically oxidizing a 2-pyrazoline of the general formula



II

where R^1, R^2 and R^3 have the abovementioned meanings, in the presence of an ionic halide.

4,702,804

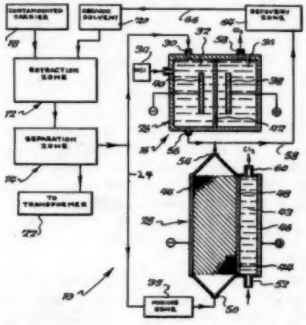
METHODS FOR ELECTROCHEMICAL REDUCTION OF HALOGENATED ORGANIC COMPOUNDS

Duane J. Mazur, and Norman L. Weinberg, both of Amherst, N.Y., assignors to PCB Sandpiper, Inc., Columbus, Ohio

Filed Feb. 2, 1987, Ser. No. 9,715

Int. Cl.[4] C25C *1/00*; C02F *1/46*

U.S. Cl. 204—73 R **18 Claims**



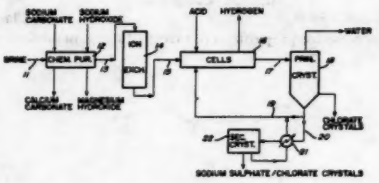
1. In a process for the dehalogenation of organic compounds by the steps of providing an electrolytic cell having an anode, a cathode and an electrolyte comprising a halogenated organic compound, and impressing a voltage across said anode and cathode sufficient to reduce the halogenated organic compound at the cathode, the improvement comprising conducting the reaction in the presence of a carbonaceous, high surface area cathode, said cathode being an amorphous carbon sufficiently graphitized to enhance dehalogenation without a substantial decrease in stability to electrochemical corrosion.

4,702,805

PRODUCTION OF SODIUM CHLORATE

John E. Burkell, North Vancouver, and Ivan H. Warren, both of Canada, assignors to C-I-L Inc., North York, Canada

Filed Mar. 27, 1986, Ser. No. 844,628
Int. Cl.[4] C25B 1/26, 1/34
U.S. Cl. 204—95 7 Claims



1. An improved continuous process for the production of sodium chlorate by the electrolysis of sodium chloride in an electrolytic process comprising:

(a) feeding water and sodium chloride contaminated with sulphate to a reaction zone wherein said sodium chloride is electrolyzed to chlorine and sodium hydroxide, said chlorine and sodium hydroxide is reacted to form sodium hypochlorite which is then reacted to produce a sodium chlorate rich liquor;

(b) cooling said sodium chlorate rich liquor to crystallize out a portion of said sodium chlorate to provide crystals of sodium chlorate and a mother liquor comprising sodium chlorate, sodium chloride and sulphate;

(c) removing said crystals of sodium chlorate;

wherein the improvement comprises:

(d) recycling a major portion of said mother liquor to said reaction zone;

(e) cooling a minor portion of said mother liquor to a temperature to effect crystallization therefrom of a portion of said sulphate as sodium sulphate in admixture with said sodium chlorate, and production of a cold saturated solution of spent mother liquor;

(f) removing said crystallized admixture from said spent mother liquor;

(g) recycling said spent mother liquor to said reaction zone; and wherein the amount of said minor portion of said mother liquor is selected such that the sulphate concentration in said reaction zone is maintained substantially constant at a predetermined level.

4,702,806

METHOD OF AND APPARATUS FOR RECOVERING A METAL FROM A SOLUTION, NAMELY AN ELECTROLYTE-CONTAINING METAL

Gilles Miller, St. Egreve, and Yves Rivasson, St. Etienne de Crossey, both of France, assignors to Surfax (Societe a Responsabilite Limitee), La Tronche, France

Filed May 23, 1986, Ser. No. 867,335
Int. Cl.[4] G25C 1/12
U.S. Cl. 204—106 17 Claims

1. A method of recovering a metal selected from the group which consists of gold, silver, platinum cadmium, zinc, lead and copper, from an electrolyte, comprising the steps of:

(a) forming a cathode compartment in a vessel by disposing a cathode of a highly electrically conductive material between two filter walls of electrically nonconductive material;

(b) continuously circulating said electrolyte through said cathode compartment by forcing said electrolyte through one of said walls into said compartment, into contact with said cathode and in turbulent flow through said compartment and then out of said compartment through the other of said walls; and

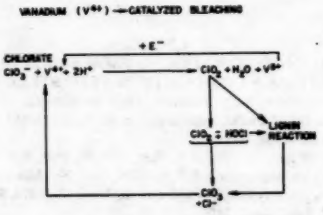
(c) electrolyzing said electrolyte between said cathode and an anode in contact with said electrolyte substantially exclusively in said compartment with a current density sufficient to deposit said metal upon said cathode in both an adherent deposit and particulate metal which sloughs from said cathode while said electrolyte is continuously circulated through said filter walls and said compartment so that said particulate metal collects on said other wall in a porous deposit of particles.

4,702,807

ELECTROCHEMICAL PROCESS FOR BLEACHING WOOD PULP USING CHLORATE AND A REDOX CATALYST

Shyam S. Bhattacharjee, Monroe; Michael N. Hull, Bardonia, and Vacheslav M. Yasnovsky, Orangeberry, all of N.Y., assignors to International Paper Company, Purchase, N.Y.

Filed Oct. 2, 1986, Ser. No. 914,364
Int. Cl.[4] C25F 5/00
U.S. Cl. 204—133 16 Claims



1. An electrochemical process for the delignification and bleaching of cellulosic pulp fibers which comprises the steps of:

(a) mixing said pulp fibers with a solution comprising a metal chlorate and a vanadium compound as a catalyst to form an untreated slurry;

(b) passing an electric current through said pulp slurry maintained at a pH less than 4.0 to form a treated slurry;

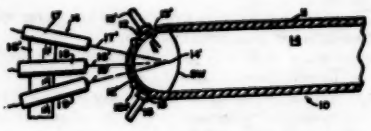
(c) pressing and washing said treated slurry to remove said pulp fibers from said treated solution.

4,702,808

CHEMICAL REACTION APPARATUS AND METHOD

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation-in-part of Ser. No. 592,968, Mar. 23, 1984, Pat. No. 4,666,678, and a continuation of Ser. No. 737,446, Oct. 29, 1976, which is a continuation of Ser. No. 165,445, Jul. 26, 1971, abandoned, and a continuation-in-part of Ser. No. 12,082, Feb. 17, 1970, abandoned, which is a continuation-in-part of Ser. No. 710,518, Mar. 5, 1968, Pat. No. 3,566,645, which is a continuation-in-part of Ser. No. 501,395, Oct. 22, 1965, Pat. No. 3,371,404, which is a continuation-in-part of Ser. No. 668,561, Jun. 27, 1957, abandoned. This application Mar. 15, 1985, Ser. No. 712,411
Int. Cl.[4] B01J 19/12
U.S. Cl. 204—157.41 20 Claims



12. A method for creating a chemical reaction comprising:

controllably directing a fluid as a stream of fluent material along a select path, which path intersects a reaction zone, so as to present molecules of said fluent material in a flow thereof through said reaction zone, and

as said fluent material passes through said reaction zone, generating and directing a collimated beam of intense radiation along a path which intersects said reaction zone such that the radiation of said beam passes through said reaction zone while molecules of said fluid are present in said reaction zone and transferring sufficient radiation from said beam to said molecules while in said reaction zone to cause said molecules to partake in a chemical reaction while located in said reaction zone.

4,702,809

PROCESS FOR THE PRODUCTION OF 1,2,3-TRICHLORO-2-METHYLPROPANE

Dieter J. Mueller, Marl, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, German Democratic Rep.

Filed Apr. 25, 1985, Ser. No. 727,176

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1984, 3415336

Int. Cl.[4] B01J 1/10; C07C 17/06

U.S. Cl. 204—157.63 **9 Claims**

1. A process for the production of 1,2,3-trichloro-2-methylpropane with selectivity substantially higher than that achieved when the same reaction is conducted in the presence of ambient light comprising reacting 3-chloro-2-methylpropene with sulfuryl chloride essentially in the absence of amines and phosphines under the effect of actinic radiation having a spectral distribution containing actinic wavelength intensities greater than those present under ambient condition.

4,702,810

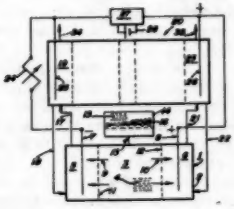
PROCESS AND DEVICE FOR ADDING IONS TO LIQUIDS, PARTICULARLY AQUEOUS SOLUTIONS

Gerhard Kunz, Ruhrstrasse 111, D-5628 Heiligenhaus, Fed. Rep. of Germany

Filed Dec. 24, 1985, Ser. No. 813,259

Int. Cl.[4] B01D 13/02; C25D 13/00

U.S. Cl. 204—182.4 **24 Claims**



1. A process for adding counterions to an electrode chamber of an electrolytic demineralization unit which comprises

(a) establishing a secondary electric potential in parallel to the electric potential of the demineralization unit using a working electrode in said electrode chamber to which counterions are to be added and another oppositely charged electrode outside said demineralization unit; and

(b) passing a counterion-containing solution through the secondary electric potential to migrate counterions toward the working electrode and away from said other electrode and through an ion exchange membrane which is permeable to said counterions but impermeable to oppositely charged ions.

4,702,811

PLATING DEVICE FOR MINUTE PORTIONS OF CONNECTOR TERMINALS

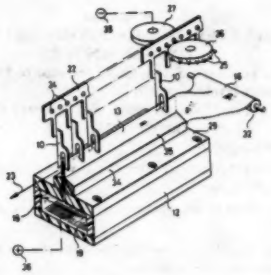
Yasuto Murata; Junichi Tezuka, both of Kanagawa, and Kenji Yamamoto, Tokyo, all of Japan, assignors to Electroplating Engineers of Japan, Limited, Tokyo, Japan

Filed Oct. 29, 1986, Ser. No. 924,653

Claims priority, application Japan, Nov. 11, 1985, 60-250949

Int. Cl.[4] C25D 17/00

U.S. Cl. 204—206 **11 Claims**



1. In a plating device suitable for plating minute portions of connector terminals which are formed in a comb teeth-like fashion on a continuous band-like member and each of which has a pair of protruding minute plating areas at the tip ends thereof, comprising: a plating solution supplying member adapted to be inserted between the pair of plating areas of each connector terminal and extending in the direction in which said connector terminals move so that said plating areas of each connector terminal can be electro-plated while they are moving in said direction by either contacting the plating solution supplying member or passing very close thereto, said plating solution supplying member comprising a supporting member made of an electrical insulating sheet which in cross-section is shaped substantially like an inverted letter U and which forms an extremely narrow passage for plating solution between the opposing sides thereof, and a plating solution retaining member made of a mesh or porous sheet and which is supported by said supporting member and which is draped over the outer surface of said supporting member, the thickness of said plating solution supplying member being made small enough so that it can be inserted between said plating areas, the combination of said supporting member and said plating solution retaining member being erected upon a plating solution box in the form of a thin elongated blade, said supporting member being provided with plural, discrete, longitudinally spaced-apart plating solution supplying holes 17 arranged in the longitudinal direction at positions corresponding to the plating areas or close thereto, and an anode positioned for contacting said plating solution.

4,702,812

ELECTROLYTIC APPARATUS AND A METHOD OF OPERATING IT

Marios Economopoulos, Liege, Belgium, assignor to Centre de Recherche Metallurgiques-Centrum Voor Research in de Metallurgie, Brussels, Belgium

Filed Oct. 14, 1986, Ser. No. 918,040

Claims priority, application Luxembourg, Oct. 15, 1985, 86119

Int. Cl.[4] C25D 17/00

U.S. Cl. 204—208 **6 Claims**

1. Electrolytic apparatus comprising an electrolytic circuit including an anode and a cathode very close to the anode; means for producing high turbulence in an electrolyte between the anode and the cathode, said means comprising a plate

constituting the anode and having a first set of orifices distributed over the surface of the plate and a second set of orifices distributed over the surface of the plate near the first set of orifices, electrolyte supply means connected to the first set of orifices, and electrolyte discharge means connected to the second set of orifices; a substrate and means for separating from the substrate a foil formed thereon by electrolysis of the electrolyte; heating means for heating the foil to a temperature above its recrystallisation temperature, and means for rapidly cooling the foil to a temperature near ambient temperature.

4,702,813

MULTI-LAYERED AMORPHOUS METAL-BASED OXYGEN ANODES

Michael A. Tenhover, Solon, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 16, 1986, Ser. No. 942,176
Int. Cl.[4] C25B *1/02*
U.S. Cl. 204—290 R **29 Claims**

1. Multi-layered amorphous metal-based anodes comprising:
a substrate material;
a first coating of an amorphous metal alloy applied thereto; and
a second coating of a different amorphous metal alloy applied to said first coating
wherein said first amorphous metal alloy is selected from the group consisting of alloys having the formula

$$T_{100-x}M_x$$

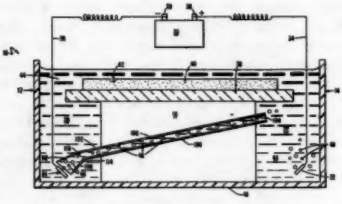
where
T is Ti, Nb, Ta, Zr and mixtures thereof;
M is N, P, As, Si, B, Ge, Al, Sb and mixtures thereof and
x is greater than 0 and less than or equal to 25.

4,702,814

NON-MECHANICAL BUFFER CIRCULATION APPARATUS FOR ELECTROPHORESIS

Zuheir L. Audeh, Brookline, Mass., assignor to Center for Blood Research, Boston, Mass.

Filed Sep. 15, 1986, Ser. No. 907,405
Int. Cl.[4] G01N *27/28*
U.S. Cl. 204—299 R **2 Claims**



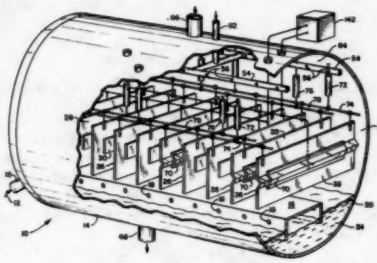
1. In a electrophoresis apparatus including a housing having at least two chambers and a support block to support a sample during electrophoresis, an anode electrode contained in one chamber and a cathode electrode contained in another chamber, and fluid in each electrode containing chamber sufficient to submerge the support block and the sample during electrophoresis, the improvement comprising:
gas collections means for collecting gas bubbles generated at an electrode; and
a conduit in fluid communication with said gas collection means, said conduit extending at a positive incline from the interior of one electrode containing chamber into the interior of the other electrode containing chamber of fluid transfer between said chambers.

4,702,815

DISTRIBUTED CHARGE COMPOSITION ELECTRODES AND DESALTING SYSTEM

Floyd L. Prestridge, Sapula, and Bruce C. Johnson, Broken Arrow, both of Okla., assignors to National Tank Company, Tulsa, Okla.

Filed May 5, 1986, Ser. No. 859,568
Int. Cl.[4] C10G *33/02*; B01D *17/06*
U.S. Cl. 204—302 **10 Claims**



1. Apparatus for dehydrating oil, comprising
a. a housing;
b. inlet means for passing oil well production having a brine content into the housing;
c. inlet means for passing relatively fresh water into the housing;
d. outlet means for removing dehydrated oil from the housing;
e. outlet means for removing brine-diluted water from the housing;
f. a plurality of substantially parallel plates forming passageways therebetween for passage of oil well production, each plate having a laminar construction comprising a substantially planar electrically nonconductive first member and a substantially planar electrically conductive second member wherein the planar dimensions of the second member are less than the planar dimensions of the first member resulting in a centrally located second member which from a perspective on the side of the first member is an electrically conductive central region surrounded by an electrically nonconductive region;
g. means for applying a non-modulated voltage to the electrically conductive second member of each plate thereby establishing an electric field in the passageway between adjacent plates;
h. distributor means mounted within the housing beneath the plurality of plates for receiving oil well production from the oil well production inlet means and for distributing the oil well production throughout the lower region of the housing so as to enter the electric field established between adjacent electrical plates;
i. distributor means mounted within the housing above the plurality of plates for receiving relatively fresh water from the fresh water inlet means and for distributing relatively fresh water in relatively large drops throughout the upper region of the housing such that the relatively large droplets of relatively fresh water enter the electric field in countercurrent flow to the oil well production, whereby as the oil well production enters the electric field established between two adjacent plates, said oil well production, in the direction of flow, is subjected to an increasing electric field gradient in passing a first nonconductive portion of the electrical plates, thence is subjected to a uniform high electric field gradient in passing a conductive central portion of the electrical plates and thence is subjected to a decreasing electric field in passing a second nonconductive portion of the electrical plates, as the relatively fresh water passes in countercurrent flow to the

oil well production through the electric field between two adjacent plates, said water is subjected to an increasing electric filed gradient in passing the second nonconductive portion of the electrical plates wherein large water droplets are sheared, thence said water is subjected to a uniform high electric field where smaller water droplets are coalesced and larger water droplets are sheared and the water is mixed with the oil well production thereby increasing the contact of water with brine, the larger droplets of diluted brine thence being subjected to a decreasing electric field gradient in passing the first nonconductive portion of the electrical plates.

4,702,816

OXYGEN CONCENTRATION DETECTION SYSTEM

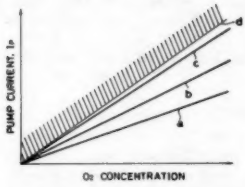
Kenshiro Hashimoto, and Yasushi Okada, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1986, Ser. No. 841,512

Claims priority, application Japan, Mar. 19, 1985, 60-56344; Sep. 7, 1985, 60-199211

Int. Cl.[4] G01N *27/30*

U.S. Cl. 204—406 **8 Claims**



1. An oxygen concentration detection system comprising:

a sensor including a pump cell element and a sensor cell element, each said element having a pair of electrodes disposed on opposing sides of a solid electrolyte layer, said pump cell element and said sensor cell element being positioned adjacent a restricted region, said pump cell element transferring oxygen into said restricted region in accordance with a pump current supplied thereto, said sensor cell element producing a sensor voltage representing an oxygen concentration within said restricted regon;

pump current supply means, operatively connected to said sensor, for supplying a pump current to said pump cell element, said pump current supply being responsive to said sensor voltage to regulate said pump current to maintain said sensor voltage substantially at a reference level;

oxygen concentration detecting means for detecting said oxygen concentration from said pump current; and

excess current preventive menans, responsive to said pump current, for comparing said pump current with a predetermined discrimination value which varies in accordance with the detected oxygen concentration and for reducing said pump current when said pump current exceeds said predetermined discrimination value.

4,702,817

REMOVING HAZE FROM HYDROCARBON OIL MIXTURE BOILING IN THE LUBRICATING OIL RANGE

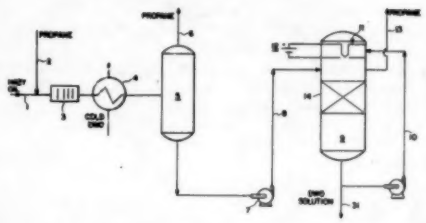
Douglas G. Ryan, Rockaway, and Steven Ackerman, Denville, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Oct. 21, 1985, Ser. No. 789,391

Int. Cl.[4] B03C *5/00*

U.S. Cl. 208—28 **24 Claims**

1. A method of removing wax and ice crystals from a hydrocarbon oil mixture boiling in the lubricating oil range, wherein at least one individual collector element consisting solely of one material, said material being selected from the group consisting of hydrocarbonaceous material and water in the solid state but being distinct from said wax and ice crystals in said hydrocarbon oil mixture, is positioned in a separation region in a separator vessel, free charge which is net unipolar is introduced into the hydrocarbon oil mixture in such manner as to cause the hydrocarbon oil mixture to act as a medium through which volumetric distribution of the introduced charge takes



place by free movement of charge through the hydrocarbon oil mixture, and the charged hydrocarbon oil mixture is passed into said separation region and into contact with said at least one collector element, there being a sufficient excess of free charge introduced such that the volumetric charge distribution causes wax and ice crystals to be driven to and deposited on said at least one collector element.

4,702,818

PROCESS FOR RECOVERING HEAT OF A TAR-CONTAINING HIGH-TEMPERATURE GAS

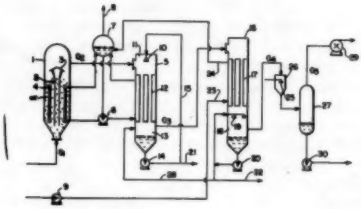
Toshiya Oyamoto; Katsuaki Makino, both of Hiroshima, and Fumio Ogawara, Fukayasu, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Nippon Kokan, both of Tokyo, Japan

Filed Nov. 26, 1984, Ser. No. 675,069

Claims priority, application Japan, Nov. 28, 1983, 58-222170

Int. Cl.[4] F28D *7/00, 13/00;* F22B *1/18;* F27D *17/00*

U.S. Cl. 208—81 **4 Claims**



1. A process for recovering heat from a tar-containing gas and simultaneous cooling the gas, which comprises (1) directing a tar-containing gas at a temperature of about 600°–800° C. through a jet cooler comprised of a bed of solid particles so that the gas contacts the solid particles and forms a fluidized bed with the flow of the tar-containing gas, said jet cooler comprising a central draft tube into which the gas is directed and indirect heat exchange lines containing a liquid coolant therein being disposed outside the central draft tube and wherein the gas and solid particles are cooled by said indirect heat exchange lines to a temperature of about 400°–500° C., such that the tar from the gas condenses on said solid particles; (2) directing the gas through a tar cooler wherein the gas-containing residual tars and other impurities resulting from the treatment in the jet cooler are sprayed with a circulating tar from a nozzle to remove residual tars and impurities from the gas and wherein the gas is cooled in said tar cooler to a temperature of about 200°–300° C. by means of an indirect heat exchange unit containing a liquid coolant therein located within

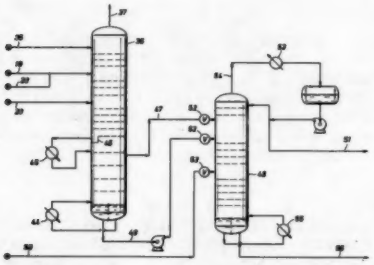
the tar cooler; and (3) further directing the thus-treated gas into an indirect heat exchange unit wherein the gas is further cooled to a temperature of about 80°–120° C. with lines carrying a liquid cooling medium and the gas finally sprayed with a light gravity tar to remove the remainder of tar and other impurities from the gas.

4,702,819

PROCESS FOR SEPARATION OF HYDROCARBON MIXTURES

Shanmuk Sharma, Houston; Donnie K. Hill, Woodlands, and Charles A. Durr, Houston, all of Tex., assignors to The M. W. Kellogg Company, Houston, Tex.

Filed Dec. 22, 1986, Ser. No. 944,319
Int. Cl.[4] C10G 7/00
U.S. Cl. 208—354 **4 Claims**



1. A process for separating hydrocarbons in a first fractionation zone having a bottoms reboiler and a second fractionation zone having a bottoms reboiler which comprises:

(a) introducing a hydrocarbon mixture to at least a first upper feed point of the first fractionation zone and recovering therefrom a first overhead vapor stream and a first bottoms liquid stream;

(b) introducing the first bottoms liquid stream to an intermediate feedpoint of the second fractionation zone;

(c) reboiling a hydrocarbon liquid sidestream removed from an intermediate liquid side draw point of the first fractionation zone and reinjecting the resulting reboiled hydrocarbon sidestream into the first fractionation zone at a point below the intermediate liquid side draw point;

(d) removing a hydrocarbon vapor sidestream from below the intermediate liquid side draw point of the first fractionation zone;

(e) introducing the hydrocarbon vapor sidestream to an upper feed point of the second fractionation zone; and

(f) recovering a second overhead vapor stream and a second bottoms liquid stream from the second fractionation zone.

4,702,820

PRETREATMENT BY ALKALINE WETTING AND HOLDING AT TEMPERATURE OF NATURAL MATERIALS HAVING AN ARGILLACEOUS GANGUE CONTAINING COMBUSTIBLE ELEMENTS

Pierre-Bernard Personnet, Aix-en-Provence, and Jean-Michel Philbert, St. Leu la Foret, both of France, assignors to Uranium Pechiney, France

Continuation of Ser. No. 673,196, Nov. 19, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 894,519
Claims priority, application France, Nov. 23, 1983, 83 19064
Int. Cl.[4] C10G 1/06, 1/00
U.S. Cl. 208—424 **11 Claims**

1. A process for pretreatment of natural materials including at least one combustible element whose gangue comprises argillaceous compounds, comprising the steps of

(a) maintaining the natural material at about atmospheric pressure,

(b) bringing the natural material into intimate contact with at least one alkaline agent in a ratio of at least 4 kg of agent, calculated in terms of OH^-, per ton of argillaceous compounds contained in said material to form a pretreatment medium, said medium having a liquid-solid ratio of between 0.05 and 0.5, calculated in terms of cubic meters of liquid present in the medium to tons of dry natural material present in the medium, such that said medium has a physical state which varies from solid to pasty, and

(c) subjecting the pretreatment medium to a pretreatment temperature of at most equal to 150° C. for at least 30 minutes,

whereby said process prevents said argillaceous compounds from forming a stable plastic suspension in the presence of water.

4,702,821

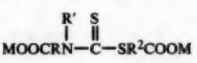
ORE FLOTATION AND DI-ALKALI METAL-DI(CARBOXYALKYL)DITHIOCARBAMATE AND DIAMMONIUM-DI(CARBOXYALKYL)DITHIOCARBAMATE FLOTATION AGENTS FOR USE THEREIN

Clarence R. Bresson, and Harold W. Mark, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 26, 1985, Ser. No. 705,824
Int. Cl.[4] B05D 1/14
U.S. Cl. 209—166 **19 Claims**

16. A process for recovering minerals comprising:

(a) mixing crushed ore containing minerals comprising molybdenum and at least one metal selected from the group consisting of copper, iron and lead, with water, and a dithiocarbamate having the formula



wherein R is selected from the group consisting of alkylene radicals, wherein R′ is selected from the group consisting of hydrogen and methyl and ethyl radicals, R^2 is selected from the group consisting of alkylene radicals and wherein M is selected from the group consisting of ammonium and alkali metal atoms, to establish a pulp;

(b) aerating said thus established pulp to produce a froth containing a first portion of said minerals comprising molybdenum while allowing a second portion of said minerals comprising at least one element selected from the group consisting of copper, iron and lead to be suppressed in said pulp; and

(c) recovering said first portion of said minerals comprising molybdenum from said thus produced froth and recovering said thus suppressed minerals from said pulp.

4,702,822

NOVEL COLLECTOR COMPOSITION FOR FROTH FLOTATION

Richard R. Klimpel, and Robert D. Hansen, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 754,328, Jul. 12, 1985, abandoned. This application Jun. 18, 1986, Ser. No. 875,836
Int. Cl.[4] B03D 1/02
U.S. Cl. 209—166 **32 Claims**

1. A composition comprising

(a) an organic compound containing at least 4 carbon atoms and one or more monosulfide units,

(b) an alkyl thiocarbonate, a thionocarbamate, a thiophosphate or mixture thereof.

4,702,823

PHOSPHINIC ACID ADDUCTS WITH MALEIC ACID SEMIESTERS, A PROCESS FOR THEIR PRODUCTION AND THEIR USE

Holger Tesmann; Helmut Blum, both of Duesseldorf, and Rita Koester, Neuss, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

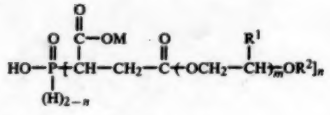
Filed Jun. 27, 1986, Ser. No. 879,716

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522930

Int. Cl.[4] B03D *1/02*

U.S. Cl. 209—166 5 Claims

1. In the process of concentrating non-sulfidic minerals from ground ores by flotation, the improvement comprising using as a collector in said process from about 10 to about 5000 g/t of ore of at least one monoadduct or diadduct of phosphinic acid with a maleic acid semiester or its salt corresponding to the following formula

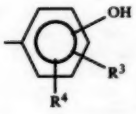


(I)

in which

R^1 is hydrogen or a methyl group,

R^2 is an unsubstituted or hydroxyl substituted C_8–C_{18} linear or branched alkyl or cycloalkyl group or an aryl group corresponding to the formula



in which

R^3 and R^4 may be the same or different and are hydrogen or a linear or branched unsubstituted alkyl group, containing from 7 to 12 C-atoms,

M is H, Na, K or NH_4,

m is an integer of from 1 to 8, and

n is 1 or 2.

4,702,824

ORE AND COAL BENEFICIATION METHOD

Khodabandeh Abadi, 5719 N. Camino Del Conde, Tucson, Ariz. 85718

Continuation-in-part of Ser. No. 752,970, Jul. 8, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 902,928

Int. Cl.[4] B03D *1/02*

U.S. Cl. 209—167 14 Claims

1. In a method for the separation of iron pyrite from a pulverized mineral ore comprising iron pyrites as a first constituent and a second constitutent selected from the group consisting of coal and non-ferrous metal ores by air froth flotation of an aqueous pulp of said pulverized mineral ore, the improvement which comprises incorporating in said pulp from about 0.02 to about 1 pound per ton of mineral of a composition comprising hydroxyacetic acid, xanthan gum, sodium silicate, and water wherein the acid content of the composition is from about 0.1 to about 69 percent by weight of the composition, the xanthan gum is from about 0.01 to about 10 percent by weight of the composition; and the ratio by weight of sodium silicate to hydroxyacetic acid is in the range of from about 0 to about 0.5.

4,702,825

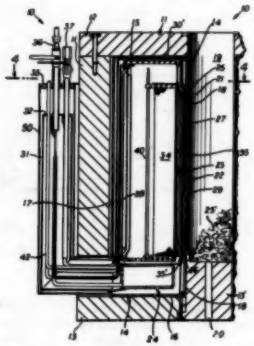
SUPERCONDUCTOR HIGH GRADIENT MAGNETIC SEPARATOR

Jerry A. Selvaggi, Erie, Pa., and John R. Purcell, San Diego, Calif., assignors to Eriez Manufacturing Company, Erie, Pa.

Filed Dec. 24, 1984, Ser. No. 685,405

Int. Cl.[4] B03C *1/02;* H02H *7/00*

U.S. Cl. 209—224 20 Claims



1. In a high gradient superconductor magnet separator comprising,

a hollow cylindrical enclosure made of ferrous material and having an axially disposed flow passage therethrough,

a toroidal shaped vacuum vessel in said cylindrical enclosure,

a toroidal shaped liquid nitrogen vessel in said vacuum vessel,

a toroidal shaped liquid helium vessel in said vacuum vessel,

said toroidal shaped liquid helium vessel being disposed concentrically to and above said liquid nitrogen vessel and spaced therefrom,

a coil made of superconducting material in said liquid helium vessel,

an inner coil support ring in said vacuum vessel and concentric to said flow passage,

said inner coil support ring having a lower end supported on said vacuum vessel and an upper end engaging said vacuum vessel,

an outer coil support ring,

said outer coil support ring having an upper end attached to said liquid helium vessel and a lower end attached to the liquid helium vessel and an intermediate part attached to an intermediate part of said inner coil support ring at a position spaced from said upper and lower ends of said inner coil support ring.

4,702,826

SCREEN CLEANER FOR PARTICLE SIZE ANALYZER

Glenn J. Pogue, Cincinnati, Ohio, assignor to Rotex, Inc., Cincinnati, Ohio

Filed Feb. 3, 1986, Ser. No. 825,149

Int. Cl.[4] B07B *1/52*

U.S. Cl. 209—237 7 Claims

1. In a particle size analyzer having a polygonal drum with graduated screens, means for rotationally indexing said drum so that said screens are successively positoned in a generally horizontal screening position for screening a sample, and means for imparting a longitudinal screening motion to the drum while each respective screen is in said screening position,

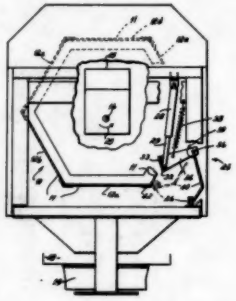
a screening cleaning means comprising,

a cleaning member,

means mounting said cleaning member for movement toward and away from the drum,

positioning means for moving said cleaning member into and out of engagement with said drum, and

control means for operating said positioning means so that said cleaning member is engaged with a screen only while said drum is being indexed rotationally between screening positions,



said positioning means retracting said cleaning member from said drum when any of said screens is in said horizontal screening position, sufficiently that said cleaning member does not interfere with said longitudinally screening motion while said sample is being screened on any of said screens.

4,702,827

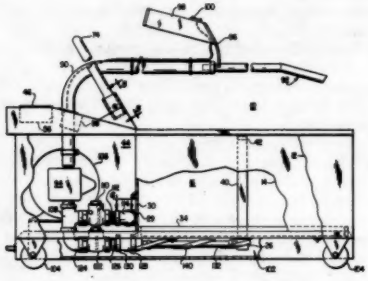
PORTABLE FILTER

Robert J. Wenzel, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.

Filed Apr. 16, 1986, Ser. No. 852,424

Int. Cl.[4] B01D *29/04, 35/26*

U.S. Cl. 210—117 **11 Claims**



9. A portable filter for a cooking apparatus utilizing a reusable cooking medium comprising:

a. a portable housing including a container having an inlet and an outlet, and a filter means, first and second valve controlled passages connected to the container inlet and outlet, respectively, a pump connected to the first and second valve controlled passages, a reversible motor connected to the pump for driving the pump in first and second directions, and a wand means, the wand means including a flexible hose connected to the pump, a wand connected to the flexible hose for insertion into the cooking apparatus, and a switch attached to the flexible hose adjacent to the wand for controlling selectively the direction of the reversible motor for the removal and return of the cooking medium to the cooking apparatus; a control panel attached to the housing, the control panel including a power ON/OFF switch adapted for connection to a source of power, and connected to the switch of the wand means; and

b. first and second circuit means interconnecting the switch on the wand flexible hose and reversible motor, the first and second circuit means responsive to the filter operation mode selection switch for producing selectively first and second power outputs to the motor wherein the reversible motor is driven selectively in first and second directions.

4,702,828

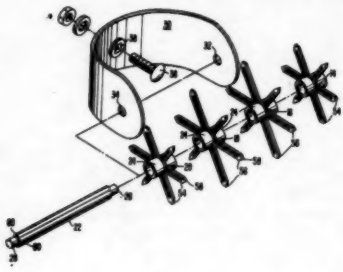
DRAIN PIPE ANIMAL GUARD

Larry B. Mehmert, Cresco, and Irene Huegel, Alta Vista, both of Iowa, assignors to Togie Corporation, Cresco, Iowa

Filed Feb. 19, 1985, Ser. No. 702,619

Int. Cl.[4] B01D *35/02, 33/00*

U.S. Cl. 210—131 **17 Claims**



1. An animal guard for drain pipe outlets comprising:

(a) an axle having a length substantially the diameter of a drain pipe and adapted for disposition substantially across the diameter of an outlet means of said pipe;

(b) a plurality of individually rotatable axially spaced wheels, each of said wheels mounted on said axle and having a plurality of radially extending prongs; and

(c) means for mounting said axle comprising a flexible band having a means for engaging the ends of said axle.

4,702,829

HEMODIAFILTRATION APPARATUS

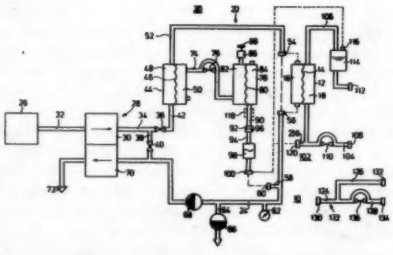
Hans-Dietrich Polaschegg, Oberursel, and Bernd Mathieu, Spiesen, both of Fed. Rep. of Germany, assignors to Fresenius AG, Bad Homburg vdH, Fed. Rep. of Germany

Filed Dec. 6, 1985, Ser. No. 806,073

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1984, 3444671

Int. Cl.[4] A61M *1/16, 1/34*

U.S. Cl. 210—195.2 **8 Claims**



1. Hemodiafiltration apparatus comprising a dialyzer (**12**) which is divided by a membrane into two chambers, the first

chamber being connected into a dialysis solution path (22) and the second chamber into an extracorporeal blood path (104, 106) of a patient, the dialysis solution path comprising a supply line (32, 34, 42, 52, 22) which extends from a means for preparing dialysis solution (26) up to the dialyzer (12) and through which a first balance chamber (30) is connected, and a discharge line (24) which extends from the dialyzer (12) to a drain (72) and through which a second balance chamber (70) is connected, a circulation pump (68) for conveying dialysis solution in the dialysis solution path, a connecting line (74) which branches from the supply line (22) between the first balance chamber (30) and the dialyzer (12) and which is connected to the blood path (104, 106), and a drip chamber (114) and a blood pump (110) in the blood path (104, 106), the improvement comprising:

a first sterile ultrafilter (44) provided between the dialysis solution path (22) and the connecting line (74), a second sterile ultrafilter (78) provided in the connecting line (74), and a substituate pump (76) connected between the first and second sterile ultrafilters (44, 78) for supplying hemofiltration replacement fluid to replace lost ultrafiltrate caused by action of said substituate pump (76) to the blood path.

4,702,830

WATER AERATION APPARATUS

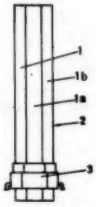
Hisao Makino, and Masahiko Makino, both of Ichikawa, Japan, assignors to Kaiyo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1985, Ser. No. 717,292

Claims priority, application Japan, Apr. 23, 1984, 59-59614[U]

Int. Cl.⁴ C02F *7/00*

U.S. Cl. 210—220 **9 Claims**



1. A water circulation apparatus comprising:

a tubular casing having a plurality of tubular passages extending in a longitudinal direction along the entire length of the tubular casing and said plurality of tubular passages being open at each end thereof; and

means for forming large intermittent air masses which pass through said tubular passages when said tubular casing is erected in a body of water, said means including an air supply chamber disposed at one end of said tubular casing and in fluid communication with downstream ends of said tubular passages, said air supply chamber being divided into a first air receiving space and a second air receiving space, said first air receiving space being in fluid communication with said tubular passages and with said tubular passages and with said second air receiving space, said second air receiving space adapted to receive air from an external air supply source and having an opening for fluid communication with a body of water to be circulated, said first and second air receiving spaces being separated by a first partition wall in said air supply chamber and being in fluid communication with each other by means of at least one aperture in said first partition wall, said aperture in said first partition wall being closer to said downstream ends of said tubular passages than said opening communicating said second air receiving space with the body of water to be circulated and said first air receiving space being separated from said tubular casing by means of a second partition wall in said air supply chamber;

whereby air supplied to said second air receiving space intermittently accumulates in said first and second air receiving spaces until an air mass having a predetermined volume is formed, at which point the air mass is in fluid communication with said tubular passages and passes through said tubular passages in a bullet shape to effect a lifting action on water above the air mass and a suction action on water located below the air mass to pump up water through said tubular passages.

4,702,831

FILTER FOR SQUEEZING OUT SUSPENSIONS

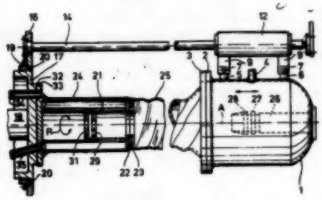
Hans Gerteis, Bietigheim-Bissingen, Fed. Rep. of Germany, assignor to Heinkel Industriezentrifugen GmbH & Co., Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Apr. 17, 1986, Ser. No. 853,237

Claims priority, application Fed. Rep. of Germany, May 10, 1985, 3516819

Int. Cl.⁴ B01D *29/00*

U.S. Cl. 210—236 **5 Claims**



1. A filter for squeezing out suspensions comprising a boiler-shaped outer casing, a cover releasably closing said outer casing at its open end face, a tubular filter element projecting from said cover coaxially to the axis of the outer casing, a flexible, hose-like membrane arranged coaxially between the outer casing and the filter element, said membrane being connected at one edge to the open end face of the outer casing and at the other edge to the free end face of the filter element remote from the cover such that the membrane is inverted when the cover is removed coaxially from the outer casing, also comprising a short suction and pressure connection pipe on the outer casing, a feed connection pipe for the suspension and a discharge connection pipe for the filtrate, these pipes being provided on the cover, and means operable in the closed state of the filter for rotating the outer casing and the membrane and the filter element as a unit about their common axis and operable in the opened state of the filter for rotating the filter element relative to the stationary outer casing while twisting the membrane.

4,702,832

COLLAPSABLE OIL SPILLAGE RECOVERY SYSTEM

John L. Renfrow, 1236 E. Alexander Street, Lafayette, La. 70501

Filed Mar. 31, 1986, Ser. No. 846,231

Int. Cl.⁴ B01D *21/00*

U.S. Cl. 210—242.3 **3 Claims**

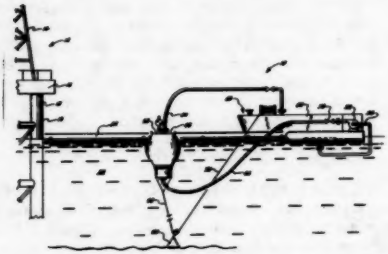
1. A system comprising means for recovering an oil spill from the surface of a body of water, including

a. a first oil confining and recovery means for concentrating and directing the layer of oil on the surface of water into a zone within the recovery means;

b. pumps means for pumping the layer of concentrated oil into a transport line;

c. a partially inflatable balloon, open ended at its lower end beneath the surface of the water for receiving the transported oil beneath the surface of the water, so that the oil percolates through the space within the balloon into the

upper portion of the balloon so that the oil separated from the water forms an oil layer on top of the water within the interior of the balloon to be removed therefrom;



d. means for at least partially submerging said balloon; and

e. means for pumping the percolated oil layer within the upper portion of the balloon to a storage barge.

4,702,833

FILTER APPARATUS

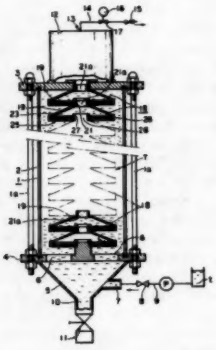
Toshio Miyata, Komaki, Japan, assignor to Kabushiki Kaisha Mitaka Kogyosho, Japan

Filed Feb. 26, 1986, Ser. No. 833,858

Claims priority, application Japan, Mar. 9, 1985, 60-46974; Mar. 9, 1985, 60-46975; May 23, 1985, 60-112333

Int. Cl.[4] B01D *29/38*

U.S. Cl. 210—333.01 **5 Claims**



1. A filter apparatus comprising:

a plurality of liquid reservoirs housed within a tank and forming a multi-stage tower, each reservoir having a central portion, an upper and lower surface and an approximately horizontal filter surface proximate to the lower surface,

an inflow clearance between each said upper surface and each said filter surface,

a plane inflow opening at each said lower surface communicating with said filter surface,

conduit means connecting the central portion of each reservoir to its neighboring reservoir in a vertical direction, said conduit means permitting internal communication between neighboring reservoirs,

a liquid inlet and inlet valve adapted to selectively supply said tank with a liquid,

a liquid outlet and outlet valve adapted to selectively discharge said tank,

a drain spout and drain valve adapted to selectively drain said tank, and

a pressurized air source selectively communicating with the interior of said multi-stage tower via said liquid outlet, and controlled by a change-over valve, said air source being sufficient to generate a turbulent flow and a downfall of liquid within said tower.

4,702,834

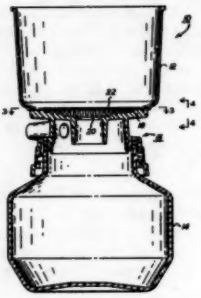
PLASTIC FILTER UNITS HAVING A WELD CELLULOSE FILTER

Robert G. Relyea, Farmington, N.Y., assignor to Nalge Company, Rochester, N.Y.

Filed Jun. 17, 1986, Ser. No. 875,206

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.78 **7 Claims**



1. A plastic filterware having a support member for supporting a filter membrane, said support member having at least one opening for the passage of a liquid therethrough, and a filter membrane consisting essentially of cellulose nitrate being welded to the surface of said support member for filtering of a liquid.

4,702,835

SEMI-PERMEABLE MEMBRANE STRUCTURE THAT IS PARTICULARLY SUITABLE FOR PLASMAPHERESIS

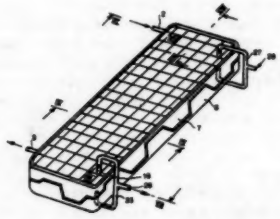
Michel Cronenberger, Mornant; Paul Lateltin, Seyssuel, and Robert Rustant, Lissieu, all of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed May 23, 1983, Ser. No. 497,048

Claims priority, application France, May 28, 1982, 82 09527

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.72 **10 Claims**



1. A semi-permeable membrane structure, comprising the combination of:

a frame including spaced peripheral side walls which define a hollow interior;

two tubes in said side walls, each providing an internal passageway that opens into the hollow interior of the frame;

membrane means on either side of said frame for forming an unobstructed fluid channel therebetween, the periphery of

each of said membrane means being disposed on said frame such that fluid introduced into the interior of said frame flows unobstructed between the two opposed surfaces of said membrane means;

two opposed rigid plates disposed on respective sides of said frame, each of said plates having on its internal face means for supporting said membrane means and means for allowing the circulation of a fluid between said membrane means and said internal face, and a peripheral support edge for ensuring a separation between said membrane means; and

means for fixing the two rigid plates to one another.

4,702,836

POROUS FLUORINE RESIN MEMBRANE AND PROCESS FOR PREPARING THE SAME

Yoshihiko Mutoh, Fujisawa, and Morikazu Miura, Yokohama, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 808,491, Dec. 13, 1985, Pat. No. 4,623,670. This application Jul. 11, 1986, Ser. No. 884,519

Claims priority, application Japan, Dec. 27, 1984, 59-273920; Apr. 9, 1985, 60-73471

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—500.23 **3 Claims**

1. A porous fluorine resin membrane comprising a fluorine resin selected from the group consisting of an ethylene-tetrafluoroethylene copolymer, an ethylene-chlorotrifluoroethylene copolymer and polychlorotrifluoroethylene, having a mean pore size of from 0.01 to 5μ and a porosity of 40 to 90%, and having a three dimensional network structure such that the symbol N designating the number of fibers constituted a network is $N \geqq 2p/D$ per 1 mm in the thicknesswise direction of the membrane, wherein p represents a porosity (%) and D represents mean pore side (μ).

4,702,837

ROTARY VORTEX SEPARATOR FOR A HETEROGENEOUS LIQUID

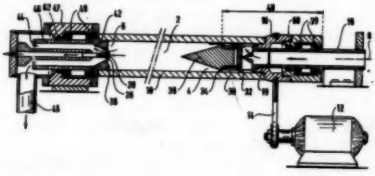
Yves Lecoffre, Le Versoud, and Jacques Woillez, Grenoble, both of France, assignors to TOTAL Compagnie Francaise des Petroles, Paris, France

Filed Dec. 23, 1986, Ser. No. 945,711

Claims priority, application France, Jan. 2, 1986, 8600015

Int. Cl.[4] B01D *17/038*

U.S. Cl. 210—512.3 **11 Claims**



1. A rotary vortex separator for a hetrrogeneous liquid, comprising:

means for receiving a flow of a heterogeneous inlet liquid constituted by a main liquid and by dispersed globules of an additional fluid having a different density from the main liquid, and having a first outlet for a major flow of a main outlet liquid constituted by said main liquid with at least a portion of said additional fluid removed therefrom, and a second outlet for a minor flow of a secondary outlet fluid containing an increased proportion of said additional fluid,

said separator having a longitudinal separator axis and comprising an elongate separation chamber having an upstream end, a downstream end, and a side wall which is circularly symmetrical about said axis, the radius of said chamber at said upstream end constituting an inlet radius,

drive means for rotating said wall about said axis,

an inlet duct for receiving said inlet liquid close to the upstream end of said chamber,

inlet accelerator guides distributed around said axis and rotating with said wall, each of said guides having an inside edge at a distance from said axis which is less than said inlet radius for receiving said liquid leaving said inlet duct, each of said guides extending to an outer edge further from said axis for moving said liquid out to a distance from said axis which is substantially equal to said inlet radius while simultaneously impressing an increased circumferential speed thereto prior to inserting the liquid into said chamber,

said chamber also having a coaxial main outlet opening formed at said downstream end and having an outside radius which is less than said inlet radius in such a manner that said main outlet liquid leaves via said opening while creating a free vortex type of flow in said chamber with the circumferential speed of the liquid increasing from the rotary wall towards an axial zone, and in such a manner that an increased centrifugal force concentrates the higher density fluid towards the wall and the lower density fluid towards said axial zone, and

at least one secondary outlet opening for delivering said secondary outlet fluid, said opening being located in a zone where the centrifugal force concentrates said fluid,

said separator further comprising liquid injection channels in said separation chamber, said channels being fixed to rotate with said rotary wall, each having a channl axis which is generally coplanar with said separator axis, and being distributed around said separator axis, each of said channels having an inlet for receiving said inlet liquid at the outlet from said inlet accelerator guides, an outlet situated at a distance from said axis which is substantially equal to said inlet radius in order to feed the inlet end of the separation chamber, and sufficient length relative to its transverse dimensions to ensure that the relative circumferential speed of said inlet liquid relative to said rotary wall is substantially cancelled when said liquid enters said separation chamber, for preventing friction between the liquid and said wall from causing a radial gradient of circumferential speed to appear which would continue against said wall along the length of said chamber, and such that said gradient does not set up turbulence suitable for compensating the separating action of the centrifugal force in the vicinity of said wall on the relatively small globules of said additional fluid.

4,702,838

SELECTIVE AND CONTINUOUS REMOVAL OF METAL-ION CONTAMINANTS FROM PLATING BATHS

Walter C. Babcock, and Dwayne T. Friesen, both of Bend, Oreg., assignors to Bend Research, Inc., Bend, Oreg.

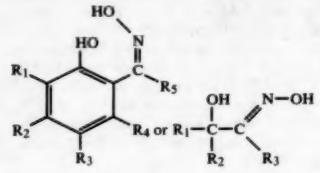
Filed Aug. 20, 1984, Ser. No. 642,419

Int. Cl.[4] B01D *15/04;* **C02F** *1/42*

U.S. Cl. 210—638 **16 Claims**

1. A method for the selective removal of copper from a nickel plating solution containing both copper and nickel ions

comprising contacting the plating solution with a hydroxyoxime complexing agent of the formula



wherein R_1 is hydrogen, alkyl, aryl and CH=N—OH; and R_2, R_3, R_4 and R_5 are hydrogen, alkyl and aryl.

4,702,839

PROCESS FOR THE RECOVERY OF MONOSACCHARIDES FROM POLY-, OLIGO- AND/OR DISACCHARIDES CONTAINING TUBEROUS PLANTS BY MEANS OF ULTRAFILTRATION

Kees Koerts, Driebergen, and Theodoor R. Hanssens, Oud-Gastel, both of Netherlands, assignors to Cooperatieve Vereniging Suiker Unie U.A., Breda, Netherlands

Filed May 18, 1984, Ser. No. 611,687

Claims priority, application Netherlands, May 19, 1983, 8301787

Int. Cl.⁴ B01D *13/00*

U.S. Cl. 210—638 **4 Claims**

1. A process for the recovery of monosaccharides from poly-, oligo-, and disaccharides containing tubers comprising the steps of:

(a) reducing said tubers to a mush by grating;

(b) subjecting the resulting mush to extraction with substantially pure water at a temperature of 18° C. or below to produce an extract;

(c) subjecting the said extract to ultrafiltration to form a filtrate;

(d) subjecting said filtrate to demineralization to form a demineralized filtrate; and

(e) subjecting said demineralized filtrate to hydrolization by passing said demineralized filtrate over a cation exchange (H+form) or by acidifying with a acid.

4,702,840

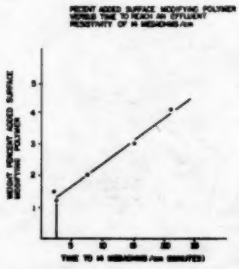
CHARGE MODIFIED POLYAMIDE MEMBRANE

Peter J. Degen; Irving B. Joffee, both of Huntington, and Thomas C. Gsell, Levittown, all of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Continuation of Ser. No. 460,019, Jan. 21, 1983, abandoned, which is a continuation-in-part of Ser. No. 346,119, Feb. 5, 1982, abandoned. This application Apr. 7, 1986, Ser. No. 848,911

Int. Cl.⁴ B01D *13/00*

U.S. Cl. 210—638 **64 Claims**



23. A charge modified, skinless, hydrophilic, microporous, alcohol-insoluble polyamide membrane derived from an alcohol-insoluble hydrophobic polyamide resin having a ratio CH_2NHCO of methylene CH_2 to amide NHCO groups within the range of from about 5:1 to about 7:1, said membrane having an integral microstructure whose characteristics are substantially controlled by cationic, quaternary ammonium groups of a cationic, quaternary ammonium, thermoset, charge modifying polymer homogeneously distributed in said membrane, thereby providing a positive zeta potential in alkaline media.

4,702,841

METHOD OF AND ARRANGEMENT FOR EXTRACORPORAL REMOVAL OF TOXINS FROM BLOOD

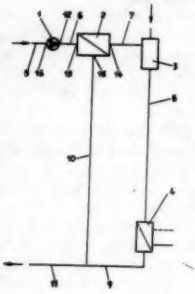
Günter V. Sengbusch, Wuppertal, Fed. Rep. of Germany, assignor to Akzo NV, Arnhem, Netherlands

Filed Nov. 22, 1982, Ser. No. 443,738

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1981, 3147377

Int. Cl.⁴ B01D *13/00*

U.S. Cl. 210—638 **26 Claims**



1. A method of extracorporal removal from blood of toxins connected with albumin bodies, comprising the steps of

withdrawing blood from a patient;

separating a blood plasma of the withdrawn blood from cellular components;

mixing a solution of a low-molecular split reagent with the separated blood plasma with a dwell time of substantially between several seconds and 30 minutes in dependence upon a particular reagent;

treating the thus mixed blood plasma with the low-molecular split reagent in an artificial kidney so as to separate toxins with molecular weight substantially less than 1,000 and the low-molecular split reagent from the plasma; and

uniting the thus obtained plasma with the separated cellular components.

4,702,842

APPARATUS FOR REVERSE OSMOSIS USING FLUID RECIRCULATION

Donald Lapierre, 1900, 127 ième rue, St. Georges de Beauce (Québec), Canada G5Y 2W8

Filed Jan. 16, 1987, Ser. No. 3,867

Int. Cl.⁴ B01D *13/00*

U.S. Cl. 210—651 **20 Claims**

1. A membrane element pumping and circulation mechanism, comprising:

(a) a cylindrical casing acting as a pressure vessel capable of withstanding reverse osmosis pressure;

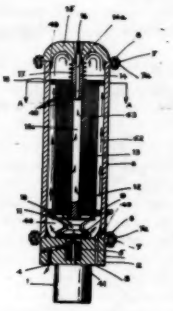
(b) a centrifugal pumping mechanism, within, and at one end of, said pressure vessel, having an impeller driven by a driving means, and having a formed housing circumferentially perforated towards its pump end, so constructed as to provide 360 degree radial discharge and to provide high volume, low pressure flow;

(c) a first end plate support at the pump impeller end of the casing, in which fluid input and first output conduits are contained, said first end plate support also being sealingly joined to the casing by a coupling device;

(d) a second end plate support at the opposite end of the casing to the impeller end, said second end cap containing a second output conduit running from the interior side to the exterior side for exit of permeate, said second end cap being sealingly joined to the casing by a coupling device;

(e) a connector of smaller diameter than the casing sited immediately inside the casing and abutting, on one side, said second end plate support, said connector acting as a restraint mechanism and containing a longitudinal passageway; said connector being arranged so that its passageway is aligned with said second output conduit contained in said second end plate support so that unimpeded throughflow of fluid is possible;

(f) a membrane module of overall cylindrical shape of smaller diameter than the casing, but of larger diameter than the connector; said membrane module being held within the casing, at the pump impeller end by said formed



impeller housing and, at the other end, by the other side of the connector so that a continuous space exists between the membrane module and the inside surface of the casing; said membrane module having a central, longitudinal passageway into which permeate passes, said membrane passageway being sealed at the impeller end by a sealing means and aligned at the connector end with said connector in such a manner that permeate may flow from said membrane passageway into the adjoining passageway of said connector;

wherein said input and first output conduits contained in said first end plate support are arranged in such a manner that fluid entering the input conduit is driven along the space between the membrane module and the inside surface of the casing, towards the connector end, where said fluid enters the membrane in which a first portion of the fluid passes into said membrane passageway as permeate which then passes through said connector passageway to said second output conduit, and a second portion of non-permeate fluid returns to the impeller through the membrane module so as to be removed as concentrate via the output conduit or to be recirculated by mixture with more incoming fluid.

4,702,843

CONTROL SYSTEM FOR AN ADVERSE TERRAIN VEHICLE

Norman D. Oswald, Duncanville; Harry S. Mankey, Dallas; Carl M. Franklin, Midlothian; James M. Wilhelm, Arlington, and Ronnie M. Osborn, Big Spring, all of Tex., assignors to Standard Manufacturing Co., Inc., Dallas, Tex.

Filed Jun. 21, 1985, Ser. No. 747,669

Int. Cl.[4] B60G *11/26*

U.S. Cl. 280—707 **22 Claims**

1. An adverse terrain vehicle having a frame with at least three wheel members rotatably mounted on each side thereof comprising:

at least two variable displacement hydraulic motors mounted on the frame each for driving at least one wheel member on one side of the vehicle independently of the wheel members on the opposing side of the vehicle;

at least two variable displacement hydraulic pumps mounted on the vehicle for supplying pressurized hydraulic fluid to the hydraulic motor on one side of the vehicle independently of the hydraulic motor on the opposing side of the vehicle;

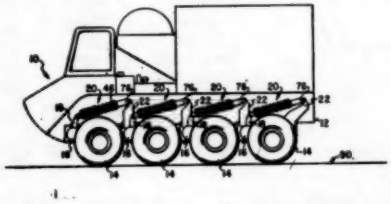
at least one prime mover for driving the hydraulic pumps;

overload sensing means for sensing a decrease in the power output of the vehicle below a selected power output;

overload protection means responsive to the overload sensing means for increasing the displacement of the hydraulic motors and for decreasing the displacement of the hydraulic pumps, thereby increasing the power output capacity of the vehicle;

steering means for directing movement of the vehicle along a selected path, including means for adjusting the speed of the hydraulic motor on at least one side of the frame to effect turning of the vehicle;

braking means response to the steering means for selectively applying braking forces to the wheel members on opposite



sides of the vehicle to reduce the velocity of the vehicle along the selected path and simultaneously turning the vehicle during braking as determined by the steering means;

wheel member positioning means for selectively vertically positioning the wheel members on each side of the vehicle relative to the frame;

means for sensing the speed of the hydraulic motor on each side of the vehicle;

motor control means responsive to the motor speed sensing means for varying the displacement of the hydraulic motor on each side of the vehicle as the motor speed exceeds a predetermined value and as the motor speed drops below a lower predetermined value;

means responsive to the steering means for adjusting the displacement of at least one of the hydraulic pumps to effect turning of the vehicle when the vehicle is slowing or coasting; and

wherein the overload control means decreases the displacement of the hydraulic motors and increases the displacement of the hydraulic pumps over a predetermined time interval following return of the power output capacity of the vehicle above a predetermined point.

4,702,844

FLOCCULANTS AND THEIR USE

Peter Flesher; David Farrar; Malcolm Hawe, and John Langley, all of West Yorkshire, England, assignors to Allied Colloids Limited, Great Britain

Filed Aug. 15, 1985, Ser. No. 766,097

Claims priority, application United Kingdom, Aug. 15, 1984, 8420693; Aug. 15, 1984, 8420694; Aug. 15, 1984, 8420695; Aug. 12, 1985, 8520218

Int. Cl.[4] C02F *1/56*

U.S. Cl. 210—733 **9 Claims**

1. A process of flocculating an aqueous suspension of organic or inorganic particles comprising adding an effective amount of a flocculant to cause flocculation in said aqueous suspension, said flocculant being a water-soluble substantially linear polymer having a single point intrinsic viscosity above 3 and that is a copolymer of (a) 1.0 to 90% by weight ethylenically unsaturated monomer including a group $-B_nA_mR$ where A is propoxy or butoxy, B is ethoxy, n is an integer of 2 to 100 and m is zero or an integer less than n, and R is a

hydrophobic group of at least 8 carbon atoms and wherein the ethylenically unsaturated monomer is selected from an ester formed between an ethylenically unsaturated carboxylic acid and said group, an ethylenically unsaturated amide substituted on the amide nitrogen atom by said group and a (meth) allyl ether with said group, with (b) 99 to 10% by weight at least one water-soluble ethylenically unsaturated comonomer selected from the group consisting of acrylic acid, methacrylic acid, 2-acrylamido methyl propane sulphonic acid, acrylamide, dialkyl amino alkyl (meth) acrylate and dialkyl amino alkyl (meth) acrylamide, including acid and quaternary salts thereof.

4,702,845

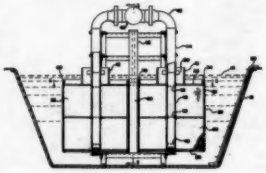
ROTARY DRUM FILTER

Richard H. Wykoff, Livonia, Mich., assignor to Amsted Industries Incorporated, Chicago, Ill.

Filed Feb. 6, 1986, Ser. No. 826,806

Int. Cl.⁴ B01D *33/06*

U.S. Cl. 210—784 **11 Claims**



1. A filtration apparatus comprising means designed for the filtering of solids suspended in a liquid and, from time to time during the filtering operation, simultaneously removing said solids deposited on a filter media to maintain continued operation of the filtration apparatus including

a drum filter having a perforated plate forming an outer shell and a suction pipe within said outer shell,

a filter media surrounding said outer shell,

means to apply suction to said suction pipe whereby liquid to be filtered is drawn into said drum filter, with solids suspended in said liquid being deposited on the outer surface of said filter media with filtered liquid being drawn into said suction pipe,

a drive means capable of rotating said drum filter,

and a vacuum box in operative connection with a portion of an outer surface of said drum filter such that, upon the rotation of said drum filter, the accumulated solids on said drum filter media are drawn off of the filter media by a flow of filtered liquid outward through the portion of the filter media in operative connection with the vacuum box when a partial vacuum is established in the vacuum box while said filtered liquid continues to be drawn into said suction pipe.

10. A filtration method comprising filtering solids suspended in a liquid and, from time to time during the filtering operation, simultaneously removing said solids deposited on a filter media to maintain continued filtering by

drawing by suction a fluid to be filtered into a drum filter having an outer perforated wall and a filter media on the outside of said wall,

drawing filtered fluid into a perforated pipe inside the drum type filter,

from time to time during the filtering operation, simultaneously removing accumulated solids from the filter media by exposing a portion of the filter media to a near vacuum thereby drawing filtered fluid outwardly through the portion of the filter media exposed to the near vacuum which breaks off the accumulated soilds on such portion of the filter media, wherein the drum filter is rotated during the removal of the accumulated solids such that about the entire filter media is exposed to the near vacuum upon a complete rotation of the drum filter while said filtered fluid continues to be drawn into said perforated pipe.

4,702,846

METHOD OF AND APPARATUS FOR SEQUENTIALLY SEPARATING A MEDIUM INTO DIFFERENT COMPONENTS

Seppo I. Ryynänen, Vaasa, Finland, assignor to Nobar Ky, Vaasa, Finland

Continuation of Ser. No. 689,037, Jan. 8, 1985, abandoned, which is a continuation of Ser. No. 469,518, Feb. 24, 1983, abandoned. This application Jul. 11, 1986, Ser. No. 883,042

Claims priority, application Finland, Jan. 21, 1983, 830199

Int. Cl.⁴ B01D *21/26, 45/16;* **B04C** *3/04, 5/24*

U.S. Cl. 210—788 **14 Claims**

1. A method of sequentially separating a medium into different components by means of centrifugal force, comprising the steps of:

forming a first array of successive separating vortexes alternately rotating in opposite flow directions and extending between spaced-apart medium entry and discharge ends respectively defined at the first vortex and at the last vortex of the successive separating vortexes of said first array, with each having a center and defining center lines between adjacent pairs of vortexes, and with each having radially central and radially outer vortex portions such that particles having a comparatively larger mass concentrate in the outer portion of a vortex and those having a comparatively smaller mass concentrate in the inner portion of a vortex;

partially overlapping the successive separating vortexes of the vortex array to substantially back-up adjacent separating vortexes on each other in corresponding interfaces both upstream and downstream relative to the corresponding center lines and flow directions and to allow downstream flow of the comparatively larger mass particles between individual adjacent vortexes to run from the outer portion of one vortex into the outer portion of its succeeding vortex without any substantial axial movement such that the larger mass particles pass successively through the vortexes of the array and end up in the last vortex of the array of vortexes and in such a way that the flow area in the back up interfaces of the partially overlapping successive separating vortexes is substantially smaller than the flow area of the successive separating vortexes elsewhere;

tangentially feeding a medium having different components to be separated into said medium entry end vortex of said first array;

axially removing the components lighter than the comparatively larger mass particles from said individual vortexes of said first array after separation, and

tangentially removing the comparatively larger mass particles from said last vortex at said discharge end thereof.

4,702,847

PROCESS FOR REMOVING SOLIDS FROM A FILTERING DEVICE FOR THE SEPARATION OF LIQUIDS AND SOLIDS

Kamil Fux, Schiebel, Schmerikon, and Ludwig Gresa, Bohlstrasse 6, Uznach, both of Switzerland

PCT No. PCT/CH82/00047, § 371 Date Nov. 24, 1982, § 102(e) Date Nov. 24, 1982, PCT Pub. No. WO82/03338, PCT Pub. Date Oct. 14, 1982

PCT Filed Mar. 24, 1982, Ser. No. 448,982

Claims priority, application Switzerland, Mar. 25, 1981, 2005/81

Int. Cl.⁴ B01D *23/24, 29/38*

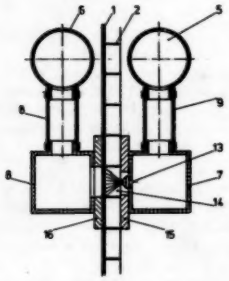
U.S. Cl. 210—798 **3 Claims**

1. A process for periodically removing solids from a gener-

ally flat filter in a system for separating solids from a liquid in a slurry, wherein the filter has an inflow side on which the solids are deposited and an outflow side supported by a grid separating the outflow side into a plurality of injection chambers, comprising the steps of:

directly contacting and engaging the grid with a jet means to close one injection chamber on the outflow side;

directing a stream of liquid through the closed chamber and



against a small region of the filter defined by the closed chamber and jet means to dislodge solids on the infow side of the filter opposite the closed chamber;

locating removal means on the inflow side of the filter in direct contact with the filter opposite the closed chamber for receiving dislodged solids and isolating the dislodged solids from the slurry; and

conveying the dislodged solids in the removal means out of the separation system.

4,702,848

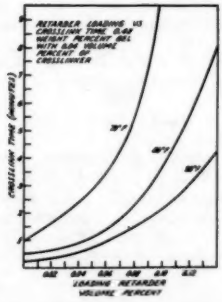
CONTROL OF CROSSLINKING REACTION RATE USING ORGANOZIRCONATE CHELATE CROSSLINKING AGENT AND ALDEHYDE RETARDING AGENT

Kathryn L. Payne, Houston, Tex., assignor to Dowell Schlumberger Incorporated, Houston, Tex.

Continuation-in-part of Ser. No. 593,377, Mar. 26, 1984, Pat. No. 4,579,670. This application Nov. 4, 1985, Ser. No. 794,375

Int. Cl.[4] B01J *13/00;* **C09K** *3/00;* **E21B** *43/26*

U.S. Cl. 252—8.551 **10 Claims**


RETARDER LOADING VS CROSSLINK TIME @ 66 WITHOUT RETARDER GEL WITH 0.06 VOLUME PERCENT OF CROSSLINKER
CROSSLINK TIME (minutes)
LOADING RETARDER VOLUME PERCENT

1. A process for fracturing a subterranean formation penetrated by a wellbore which comprises:

preparing a base gel by mixing an aqueous fluid with a gelling agent selected from hydratable polysaccharides having a molecular weight in excess of 100,000 said gelling agent being present in an amount sufficient to gel said aqueous fluid;

introducing said base gel into said wellbore in admixture with a crosslinking agent and retarding agent, said crosslinking agent comprising an organozirconate chelate present in an amount sufficient to crosslink said gelling agent, and said aldehyde retarding agent present in an amount sufficient to retard the action of said crosslinking agent upon said gelling agent;

permitting said base gel to react with said crosslinking agent over a controllable period of time to form a crosslinked gel wherein the period of time over which the crosslinking reaction occurs is controllable by altering the amount of said retarding agent admixed with said base gel; and

introducing said crosslinking gel into said formation from said wellbore at a flow rate and pressure sufficient to fracture the said formation.

4,702,849

METHOD OF INCREASING HYDROCARBON PRODUCTION FROM SUBTERRANEAN FORMATIONS

Glenn S. Penny, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

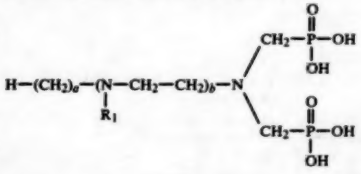
Filed Feb. 25, 1986, Ser. No. 834,171

Int. Cl.[4] E21B *43/26*

U.S. Cl. 252—8.554 **9 Claims**

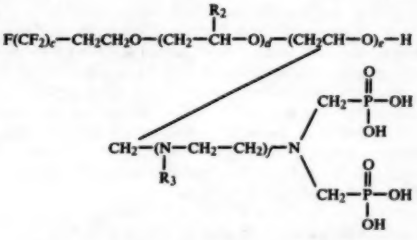
1. A method of increasing the production of hydrocarbons from a hydrocarbon-containing subterranean carbonate-containing formation comprising contacting said formation with an anionic compound whereby said compound is absorbed onto surfaces of said formation to reduce wetting of said surfaces by either hydrocarbons or water, said anionic compound being selected from individual compounds and mixtures thereof represented by the formulas:

Formula I



or

Formula II



wherein a is a whole number or fraction thereof in the range of from about 4 to about 18;

wherein b is a whole number or fraction thereof in the range of from about 1 to about 5;

wherein c is a whole number or fraction thereof in the range of from about 4 to about 18;

wherein d is a whole number or fraction thereof in the range of from about 0 to about 29;

wherein e is a whole number or fraction thereof in the range of from about 1 to about 3;

wherein f is a whole number or fraction thereof in the range of from about 0 to about 9;

R_1 is independently selected from the group consisting of hydrogen, a methyl group or methyl phosphonate;

R_2 is independently selected from the group consisting of hydrogen, a methyl group and an ethyl group; and

R_3 is independently selected from the group consisting of hydrogen, a methyl group or methyl phosphonate.

4,702,850

POWER TRANSMITTING FLUIDS CONTAINING ESTERS OF HYDROCARBYL SUCCINIC ACID OR ANHYDRIDE WITH THIO-BIS-ALKANOLS

Antonio Gutierrez, Mercerville; Stanley J. Brois, Westfield; Jack Ryer, East Brunswick, and Harold E. Deen, Cranford, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

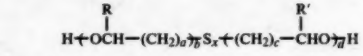
Continuation of Ser. No. 359,801, Mar. 19, 1982, abandoned, which is a continuation-in-part of Ser. No. 194,067, Oct. 6, 1980, abandoned. This application Jul. 16, 1986, Ser. No. 886,304

Int. Cl.[4] C10M *135/24*

U.S. Cl. 252—48.2 10 Claims

1. A process for improving the friction modification properties of a power transmission fluid containing at least one friction modification agent and a mineral oil base, which comprises employing as at least one of said friction modifying agents, at least one ester additive formed by the reaction of:

(a) a thio bis-alkanol of the formula:



wherein R and R' each independently may be hydrogen, methyl or ethyl, x may be 1–4, and a, b, c, d, each may be independently 1–3, with (b) 1 to 2 moles, per mole of the thio-bis-alkanol, of an aliphatic hydrocarbon-substituted succinic acid or anhydride wherein the aliphatic hydrocarbon group contains from 12 to 50 carbon atoms, the additive being present in an amount effective to provide friction modification, corrosion inhibition, anti-wear, oxidation inhibition or extreme pressure properties to said fluid.

4,702,851

DISPERSANT ADDITIVES FOR LUBRICATING OILS AND FUELS

Robert H. Wollenberg, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 835,130, Feb. 28, 1986, Pat. No. 4,624,681, which is a division of Ser. No. 643,217, Aug. 22, 1984, Pat. No. 4,584,117. This application Oct. 8, 1986, Ser. No. 916,571

Int. Cl.[4] C10M *133/44, 139/00*

U.S. Cl. 252—49.6 14 Claims

1. A product prepared by the process which comprises:

(a) first reacting a polyamine with a cyclic carbonate at a temperature sufficient to cause reaction wherein the molar charge of said cyclic carbonate to the basic amine nitrogen of said polyamine is from about 0.1:1 to about 10:1;

(b) contacting at a temperature sufficient to cause reaction the product of (a) above with an alkenyl or alkyl succinic anhydride wherein the molar charge of said alkenyl or alkyl succinic anhydride to said product of (a) above is from about 0.5:1 to about 5:1; and

(c) reacting the product of (b) above with a boron compound selected from the group consisting of boric acid, boron oxides, boron halides and esters of boric acid employing from about 0.1 equivalent to 10 equivalents of boron compound to the product of (b) above.

4,702,852

MULTIPOLARLY MAGNETIZED MAGNET

Takashi Sakauchi; Fumihiko Mohri; Naohisa Tomoda, all of Ohtsu, and Satoshi Nakatsuka, Mohka, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

PCT No. PCT/JP86/00176, § 371 Date Feb. 12, 1987, § 102(e) Date Feb. 12, 1987, PCT Pub. No. WO86/06207, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 10, 1986, Ser. No. 939,850

Int. Cl.[4] C04B *35/04;* H01F *1/00, 1/26*

U.S. Cl. 252—62.54 3 Claims

1. A multipolarly magnetized anisotropic plastics magnet formed by molding, followed by solidifying, a composition composed of a magnetic powder and an organic binder in the presence of a magnetic field, and subsequently multipolarly magnetizing the thus obtained anisotropic plastics magnet, said magnetic powder being magnetoplumbite ferrite which is characterized by that the green density is not less than 3.1 g/cm^3 and the intrinsic coercive force of the green compact is not more than 2500 oersteds.

4,702,853

PHASE CHANGE THERMAL ENERGY STORAGE MATERIAL

David K. Benson, Golden, and Richard W. Burrows, Conifer, both of Colo., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Oct. 6, 1986, Ser. No. 915,842

Int. Cl.[4] C09K *5/06*

U.S. Cl. 252—70 18 Claims

6. A thermal energy storage tank comprising a containment vessel arranged for exposure to thermal energy, and a thermal energy storage composition disposed within said vessel and comprising a non-chloride hydrate having a phase change transition temperature in the range of 70°–95° F. and a latent heat of transformation of greater than about 35 calories/gram wherein said non-chloride hydrate comprises trimethyol ethane hydrate.

4,702,854

WATER-BASED HYDRAULIC FLUIDS COMPRISING POLY-OXAZINES OR POLY-OXAZOLINES

Kenneth L. Snyder, Jr., and Syamalarao Evani, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 2, 1983, Ser. No. 490,938

Int. Cl.[4] C10M *105/00, 105/08, 105/70*

U.S. Cl. 252—75 17 Claims

1. A substantially oil-free hydraulic fluid or metalworking composition which maintains a substantially Newtonian and shear stable viscosity comprising an aqueous liquid containing a lubricity aid and a functionally effective amount of a poly-2-oxazine or a poly-2-oxazoline.

4,702,855

ELECTROVISCOUS FLUIDS

John Goossens; Günter Oppermann, both of Leverkusen, and Wolfgang Grape, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 1, 1986, Ser. No. 914,211

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1985, 3536934

Int. Cl.[4] C09K *3/00*

U.S. Cl. 252—75 7 Claims

1. An electroviscous fluid comprising more than 25% by weight of an aluminum silicate with a water content of 1 to 25% by weight as a disperse phase and an electrically non-conductive hydrophobic liquid as a liquid phase and a dispersing agent, wherein the atomic ratio Al/Si on the surface of the aluminum silicate lies in the range of 0.15 to 0.80.

4,702,856

ORGANIC CAR WASH CONTAINING RAW POTATO JUICE

Leon Iknadossian, P.O. Box 2022, City of Industry, Calif. 91746

Filed Jan. 12, 1987, Ser. No. 2,507

Int. Cl.[4] C11D *1/04, 3/43, 3/382, 17/08*

U.S. Cl. 252—170 1 Claim

1. A composition for washing automobile bodies and win-

dows comprising about 77% raw potato juice, above 20% 190 proof denatured alcohol, about 1% sodium stearyl fumerate and about 2% non-ionic surfactant.

4,702,857

BLOCK POLYESTERS AND LIKE COMPOUNDS USEFUL AS SOIL RELEASE AGENTS IN DETERGENT COMPOSITIONS

Eugene P. Gosselink, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 684,511, Dec. 21, 1984, abandoned. This application Nov. 22, 1985, Ser. No. 801,020

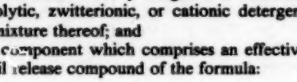
Int. Cl.[4] C11D *3/37*

U.S. Cl. 252—174.21 40 Claims

16. A detergent composition which comprises:

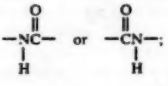
(a) from about 1 to about 75% by weight of a nonionic, anionic, ampholytic, zwitterionic, or cationic detergent surfactant, or mixture thereof; and

(b) a soil release component which comprises an effective amount of a soil release compound of the formula:



wherein each of the A moieties is selected from the group consisting of

and combinations thereof with either or both of the moieties



each of the R^1 moieties is selected from the group consisting of 1,4-phenylene[,] *and combinations thereof with* 1,3-phenylene, 1,2-phenylene, 1,8-naphthylene, 1,4-naphthylene, 2,2'-biphenylene, 4,4'-biphenylene, C_1–C_8 alkenylene, or C_1–C_8 alkylene, or mixtures thereof; the R^2 moieties are each selected from the group consisting of ethylene moieties, substituted ethylene moieties having C_1–C_4 alkyl or alkoxy substituents or mixtures thereof; the R^3 moieties are substituted C_2–C_{18} hydrocarbylene moieties having least one [—SO_3M,] —COOM, —O-[-$(R^5O)_m(CH_2CH_2O)_n$-]-X or —A-[-$(R^2$—A—R^4—A)—]$_w$ [—$(R^5O)_m(CH_2CH_2O)_n$-]-X substituent; the R^4 moieties are R^1 or R^3 moieties, or a mixture thereof; each R^5 is C_3–C_4 alkylene, or the moiety —R^2—A—R^6—, wherein R^6 is a C_1–C_{12} alkylene, alkenylene, arylene or alkarylene moiety; each M is H or a water-soluble cation; each X is C_1–C_4 alkyl; *m* and *n* are numbers such that the moiety —(CH_2CH_2O)— comprises at least about 50% by weight of the moiety -[-$(R^5O)_m(CH_2CH_2O)_n$-]-, provided that when R^5 is the moiety —R^2—A—R^6—, *m* is 1; each *n* is at least about 6; *u* and *v* are numbers such that the sum of $u+v$ is from about 3 to about 25; *w* is 0 or at least 1; and when *w* is at least 1, *u*, *v* and *w* are numbers such that the sum of $u+v+w$ is from about 3 to about 25.

4,702,858

WASHING AGENTS CONTAINING, AS ADDITIVES, CARBOXYL-CONTAINING COPOLYMERS WHICH ARE NEUTRALIZED OR AMIDATED WITH AMINES

Walter Denzinger, Speyer; Heinrich Hartmann, Limburgerhof; Wolfgang Trieselt; Erhard Klahr, both of Ludwigshafen, and Albert Hettche, Hessheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 24, 1986, Ser. No. 888,957

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1985, 3528460

Int. Cl.[4] C11D *3/37*

U.S. Cl. 252—174.24 8 Claims

1. A washing agent based on surfactants, builders, bleaches and conventional additives, which, in order to reinforce the primary washing action and as an antiredeposition agent, contains from 0.5 to 10% by weight, based on the solids, of an amine neutralized or amidated homopolymer of acrylic acid and methacrylic acid, a copolymer of acrylic acid and methacrylic acid, a copolymer which contains, as essential components,

(a) from 10 to 70% by weight of an ethylenically unsaturated dicarboxylic acid of 4 to 6 carbon atoms and

(b) from 90 to 30% by weight of acrylic acid, methacrylic acid, a hydroxy-C_2–C_6-alkyl ester of an ethylenically unsaturated C_3–C_5-carboxylic acid, or mixtures thereof, as copolymerized units,

or mixtures of the homo- and copolymers,

where the homo- and copolymers in the form of free acids have a weight average molecular weight of from 5000 to 500,000, said homo- and copolymers being in the neutralized or amidated form, at least 5% of the carboxyl groups of the homo- and copolymers in each case being neutralized with a primary secondary or tertiary amine of the formula:

(I)

where R is C_8–C_{18}-alkyl or R^1—O—CH_2—$(CH_2)_n$—, n is from 1 to 3, R^1 is C_1–C_{18}-alkyl, R^2 and R^3 are each H or C_1–C_{18}-alkyl, or from 5 to 50% of the said carboxyl groups being in the amidated form derived from a primary or secondary amine of the formula I, or said polymer being both neutralized and amidated.

4,702,859

ELECTRICALLY CONDUCTIVE POLYAMIDE RESIN COMPOSITION

Senzo Shimizu, Osawara; Isao Nomura, and Kenichi Narita, both of Hiratsuka, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Dec. 29, 1986, Ser. No. 948,136

Claims priority, application Japan, Mar. 31, 1986, 61-71051

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 2 Claims

1. An electrically conductive polyamide resin composition comprising

(A) 100 parts by weight of a polyamide resin derived from xylylenediamine as a main diamine component and an alpha, omega-linear aliphatic dicarboxylic acid as a main dicarboxylic acid component,

(B) 5 to 100 parts by weight of nylon 66,

(C) 30 to 300 parts by weight of glass fibers,

(D) 5 to 40 parts by weight of furnace black, and

(E) 5 to 40 parts by weight of graphite.

4,702,860

CURRENT-CONDUCTING COMPOSITION

Petr A. Kinderov; Nikolai S. Volkov; Natalia V. Vasilieva, and Regina T. Malashkina, all of Tashkent, U.S.S.R., assignors to Nauchno-Issledovatelsky Institut Kabelnoi Promyshlennosti Po "Sredazkabel" , U.S.S.R.

Continuation of Ser. No. 620,871, Jun. 15, 1984, abandoned. This application Jan. 2, 1986, Ser. No. 815,761

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 5 Claims

1. A process for producing a current conducting composition comprising a polymeric base and a current-conducting carbon black which comprises

(a) treating carbon black with a 5% aqueous solution of borax or boric acid.

(b) drying at 110°–120° C.

(c) heat treating in a weak reducing medium at a temperature within the range of about 2000°–2500° C., resulting in a current conducting carbon black, and

(d) introducing the current conducting carbon black into a polymeric base of thermoplastics, thermosetting resins or elastomers wherein the current conducting carbon black is chemically combined with 0.18–0.5% by mass of boron and has a specific adsorption surface area of 60–110 m^2/g, and the composition contains the following proportions of the components, parts by mass:

polymeric base: 100

current-conducting carbon black: 38–240.

4,702,861

FLAME RETARDANT MATERIALS

Bruce W. Farnum, Grand Forks, N. Dak., assignor to Certified Technologies Corporation, Eden Prairie, Minn.

Filed May 14, 1986, Ser. No. 863,056

Int. Cl.[4] C09K *21/00;* C09D *5/16, 5/18*

U.S. Cl. 252—601 2 Claims

1. A flame retardant surface coating for creation of a substantially continuous film over normally combustible materials, comprising an aqueous dispersion having the following formulation:

Composition	Percent Range by Weight
$CaCO_3$	8–16%
$Al_2O_3.3H_2O$	5–20%
Nonylphenoxypoly (ethyleneoxy)ethanol/ lecithin	0.6 to 1.2%
Colloidal SiO_2 and/or Texipol	1 to 2%
Polyacrylic acid	0.5 to 1%
Decabromodiphenyloxide	0.5 to 2%
Isodecyldiphenyl phosphate	0.5 to 5%
An oxide of antimony selected from the group consisting of antimony trioxide and colloidal antimony pentoxide	0 to 1.75%
Ammonia 26 degree Baume' or potassium tripolyphosphate	0.1 to 0.3%
Polyvinylchloride acrylic copolymer latex solids in 50% water solution	30%
Water (including water present in the polyvinylchloride acrylic copolymer latex)	35 to 50%
Titanium dioxide and tinting pigments	0 to 5%.

4,702,862

METHOD FOR THE FINAL CONDITIONING OF RADIOACTIVE AND/OR TOXIC WASTE

Friedrich-Wilhelm Ledebrink, Maintal, Fed. Rep. of Germany, assignor to Alkem GmbH, Hanau, Fed. Rep. of Germany

Filed Oct. 25, 1982, Ser. No. 436,302

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1981, 3142356

Int. Cl.[4] G21F *9/16*

U.S. Cl. 252—628 4 Claims

1. A method for the final conditioning of radioactive and/or toxic waste which comprises mixing said waste with a radioactive thermoplastic synthetic waste material with a greater than naturally occurring level of radioactivity, said mixture of waste and radioactive thermoplastic synthetic waste material containing radioactive, chlorine-containing thermoplastic synthetic waste material, heating the mixture of said waste and said thermoplastic waste material to a temperataure sufficient to make the thermoplastic waste material flow and become effective as a matrix material enclosing from all sides radioactive waste components of said waste that have remained solid, prior to said heating admixing a substance which binds HCl without gas development to the radioactive thermoplastic synthetic waste material to prevent release of HCl gas resulting from the decomposition of the chlorine-containing thermoplastic waste material during said heating, and cooling the thermoplastic waste material having embedded therein the solid radioactive waste components of said waste material to solidfy it.

3. A method for the final conditioning of radioactive and/or toxic waste which comprises mixing said waste with a radioactive thermoplastic synthetic waste material with a greater than naturally occurring level of radioactivity, said mixture of waste and radioactive thermoplastic synthetic waste material containing radioactive, halogen-containing thermoplastic synthetic waste material, placing the mixture of said waste and said thermoplastic waste material in a polytetrafluoroethylene container, closing said container, thereafter heating the mixture of said waste and said thermoplastic waste material uniformly in the closed container in an electromagnetic high-frequency field to avoid local overheating of the mixture and minimize decompositin of the halogen-containing thermoplastic material with accompanying liberation of a halogen-containing gas to a temperature sufficient to make the thermoplastic waste material flow and become effective as matrix material enclosing from all sides radioactive waste components of said waste that have remained solid, maintaining an atmosphere in the container during heating of less than 1 bar by applying suction through an opening in the container to minimize formation of voids by gas bubbles in radioactive thermoplastic material in the container, cooling the thermoplastic waste material having embedded therein the solid radioactive waste components of said waste material to solidify it, placing the container together with its contents in a barrel of alloy steel, closing said barrel and subsequently sending said closed barrel to ultimate storage.

4,702,863

INDOANILINE AND INDOPHENOL COMPOUNDS, A PROCESS FOR THEIR PREPARATION, DYEING COMPOSITIONS CONTAINING THEM AND A HAIR-DYEING PROCESS

Andrée Bugaut, Boulogne, and Alex M. Junino, Aulnay, both of France, assignors to L'Oreal, Paris, France

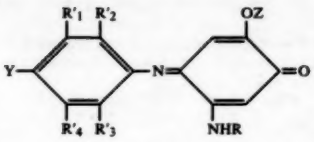
Continuation of Ser. No. 618,336, Jun. 7, 1984. This application Jul. 14, 1986, Ser. No. 884,904

Claims priority, application France, Jun. 13, 1983, 83 09735

Int. Cl.[4] C07C *50/04, 50/06*

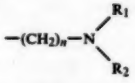
U.S. Cl. 260—396 N 13 Claims

1. A compound of formula:



(I)

wherein Z represents a monohydroxylated or polyhydroxylated hydrocarbon radical, of 1 to 6 carbon atoms, or an aminoalkyl radical of formula:



wherein n is an integer from 1 to 6 and R_1 and R_2, which are identical or different, represent a hydrogen atom or an alkyl, hydroxyalkyl or acyl radical of 1 to 4 carbon atoms; R represents a hydrogen atom or an alkyl, hydroxyalkyl, polyhydroxyalkyl, monocarbamylalkyl, dicarbamylalkyl, aminoalkyl, acyl, alkoxycarbonyl, carbamyl or monoalkylcarbamyl radical of 1 to 6 carbon atoms; R'_1, R'_2, R'_3 and R'_4, which are identical or different, represent a hydrogen atom, a halogen atom or an alkyl, hydroxyalkyl, alkoxy or hydroxyalkoxy radical, of 1 to 6 carbon atoms; and Y represents OH or $NR'_5R'_6$, wherein R'_5 and R'_6, which are identical or different, represent a hydrogen atom or an alkyl, monohydroxyalkyl, polyhydroxyalkyl, carbamylalkyl, mesylaminoalkyl or methoxyalkyl radical of 1 to 6 carbon atoms.

4,702,864

ANALOGS OF PLATELET ACTIVATING FACTOR

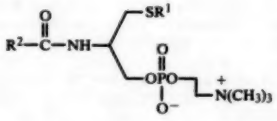
Ronald L. Magolda, Aston, Pa.; Pasquale N. Confalone, Wilmington, and Paul R. Johnson, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 780,770, Sep. 27, 1985. This application Jul. 16, 1986, Ser. No. 884,669

Int. Cl.[4] C08H *3/00, 9/02*

U.S. Cl. 260—402.5 **26 Claims**

1. A compound of the formula



and physiologically acceptable salts thereof,

wherein

R^1 is C_1–C_{25} alkyl, C_1–C_{25} alkenyl, C_6–C_{30} aryl, or C_7–C_{30} aralkyl; and

R^2 is hydrogen, C_1–C_{25} alkyl, C_6–C_{30} aryl, C_7–C_{30} aralkyl or alkaryl, C_1–C_{25} alkoxy, C_1–C_{25} alkenyloxy, C_6–C_{30} aryloxy, or C_7–C_{30} aralkyloxy or alkaryloxy.

4,702,865

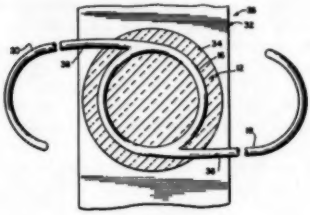
METHOD OF FORMING AN INTRAOCULAR LENS

Jeffrey E. Koziol, 601 West Central, Mount Prospect, Ill. 60056, and Gholam Peyman, 535 N. Michigan Ave., Chicago, Ill. 60611

Division of Ser. No. 648,600, Sep. 10, 1984, Pat. No. 4,615,702. This application Jun. 19, 1986, Ser. No. 876,178

Int. Cl.[4] B29D *11/00*

U.S. Cl. 264—17 **10 Claims**



1. A method of making an intraocular lens comprising the steps of

forming a resilient support including an annular portion and mounting arms,

positioning the entire annular portion of the support in a mold,

molding a soft, resilient optical element in the mold including introducing material forming the optical element into the mold in liquid form and completely surrounding the annular portion of the support in the mold with such material forming the optical element so that the annular portion is adjacent and supports the periphery of the optical element,

converting the material forming the optical element from liquid form into solid but soft and resilient form by elevating the temperature of the mold to a predetermined temperature, the material forming the annular portion of the resilient support positioned in the mold having a melting point greater than the elevated predetermined temperature, and

removing the intraocular lens formed by the support and the optical element from the mold.

4,702,866

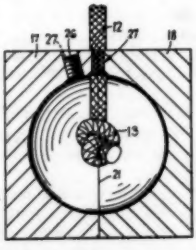
METHOD OF MAKING AN EXPANDED BALL BATTING AID

Dennis M. Krueger, St. Joseph, Mich., assignor to K-Bear Athletics, Inc., St. Joseph, Mich.

Division of Ser. No. 625,879, Jun. 28, 1984, abandoned. This application Sep. 20, 1985, Ser. No. 778,475

Int. Cl.[4] B29C *67/22, 39/10;* **C08J** *9/34*

U.S. Cl. 264—46.4 **3 Claims**



1. A process for securing an object made of an expandible elastomeric material to a finite length of braided rope using a

pair of mating mold halves each having a mold cavity therein, a cylindrical hole through the wall of said mold, the parting plane between said mold halves bisecting said hole on a diameter so that each mold half has a semicylindrical recess therein, said hole having a diameter less than the uncompressed diameter of said rope, the steps comprising:

separating said pair of mold halves to expose at least one of said mold cavities therein;

placing an enlargement on one end of said rope;

placing said enlargement into the approximate center of a mold cavity in said one of said mold halves and a length of said braided rope adjacent said enlargement in said semicylindrical recess;

moving said mold halves together into a tight sealing relation to form said mold cavity while simultaneously compressing said length of said braided rope in said hole;

filling said mold cavity with said expandible elastomeric material and a catalyst to cause said material to expand in said mold cavity to occupy the entirety thereof;

controlling the volume of said expandible elastomeric material and said catalyst introduced into said mold so that said material will expand to fill said mold cavity and permeate said rope between the braids thereof, said length of said rope in said hole and which is compressed permitting a limited outflow of material into said hole and through the spacing between the compressed braids of said rope but insufficient to leave the confines of said hole.

4,702,867

METHOD FOR CONTINUOUSLY VULCANIZING HOSES

Akinobu Sejimo, and Shigeo Ono, both of Hadano, Japan, assignors to Kabushiki Kaisha Meiji Gomu Kasei, Tokyo, Japan

Filed Jan. 30, 1986, Ser. No. 824,048

Claims priority, application Japan, Jun. 17, 1985, 60-131515

Int. Cl.⁴ B29C *35/10*

U.S. Cl. 264—25 **4 Claims**

1. A method for continuously vulcanizing a hose comprising:

providing tightly on the outer periphery of a continuously moving extruded hose of unvulcanized rubber an extruded covering layer of heat-resistant resin which has a small microwave absorption and a melting point higher than the vulcanizing temperature of said unvulcanized rubber;

cooling the resin covered hose to harden the resin covering;

applying microwave radiation to the resin covered hose in a microwave vulcanizing tank whereby the rubber hose is selectively heated and is partially vulcanized in an initial vulcanization stage;

maintaining the partially vulcanized resin-covered hose in a heated vulcanizing tank under normal pressure until vulcanization of the rubber is completed by heat conduction by means of a heating medium provided in the tank, whereby the resin covering is also softened;

peeling off the softened resin covering.

4,702,868

MOLDABLE SILANE-CROSSLINKED POLYOLEFIN FOAM BEADS

Thomas M. Pontiff, Saratoga Springs, and Frederick H. Collins, Glens Falls, both of N.Y., assignors to Valcour Incorporated, Glens Falls, N.Y.

Filed Feb. 24, 1987, Ser. No. 17,674

Int. Cl.⁴ B29C *71/00*

U.S. Cl. 264—50 **15 Claims**

1. A process of producing moldable foam beads comprising a silene-crosslinked polyolefin foam, comprising the steps of:

(a) mixing a composition comprising a silane-modified polyolefin and a silanol condensation catalyst in an extruder to produce a melt;

(b) injecting a blowing agent into said melt at a rate effective to produce the desired foam density in the extrudate;

(c) extruding and cutting said melt to form foam beads, and

(d) exposing said foam beads to moisture to produce silane crosslinking of the polyolefin foam.

4,702,869

PROCESS FOR THE PRODUCTION OF CERAMICS

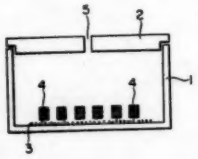
Matsuo Higuchi; Osamu Komura, and Eiji Kamijo, all of Itami, Japan, assignors to Director General, Agency of Industrial Science and Technology, Tokyo, Japan

Continuation of Ser. No. 677,676, Nov. 30, 1984, abandoned. This application Oct. 17, 1986, Ser. No. 920,908

Claims priority, application Japan, Dec. 2, 1983, 58-226778; Oct. 26, 1984, 59-224092

Int. Cl.⁴ C04B *33/32*

U.S. Cl. 264—65 **3 Claims**



1. A process for the production of ceramics, which comprises sintering ceramic materials containing silicon nitride as a predominant component, machining the surface of the resulting sintered compact, heating the compact within a carbon case up to a temperature of at least 1000° C. in a vacuum of at most 1×10^{-3} Torr and then subjecting the compact within the carbon case to a heat treatment at a temperature of from 1200° C. to the sintering temperature in a nitrogen atmosphere of one atmosphere or more.

4,702,870

METHOD AND APPARATUS FOR FORMING THREE DIMENSIONAL STRUCTURAL COMPONENTS FROM WOOD FIBER

Vance C. Setterholm, Blue Mounds, and John F. Hunt, Madison, both of Wis., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 20, 1986, Ser. No. 864,920

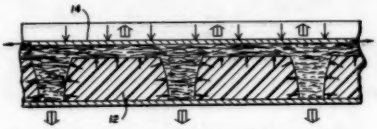
Int. Cl.⁴ B28B *1/52*

U.S. Cl. 264—87 **35 Claims**

1. A method of making a three-dimensional object of wood fiber, said object comprising a substantially flat side and webs extending from the object at an angle to the flat side from the side thereof, opposite said flat side, comprising the steps of providing a first porous support, providing first mold inserts on said support, forming said mold inserts of resilient material, depositing wood fiber on said suppor around and on top of said mold inserts using a carrier fluid technique wherein said fibers

are carried in a fluid and the fluid flows through the mat of fibers deposited on the mold inserts, permitting the mat of fibers to settle and the fluid to exit through the pores of said support due to gravity and/or pressure differential pressing the mat on the mold inserts and the support using a flat surfaced press member by applying a pressing force normal to said flat surfaced press member to compress said mold inserts and to squeeze out remaining carrier fluid used in said flow deposition stop, said compresser of said mold inserts causing said mold inserts to generate three-dimensional forming forces, thereby causing densification of said mat in directions parallel to and other than parallel to said pressing force, and removing the compressed object from said support and from said mold inserts.

18. Apparatus for making a three-dimensional object of wood fiber, said object comprising a substantially flat side and



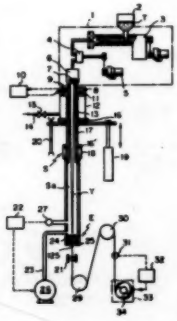
webs extending from the object at an angle to the flat side from the side thereof opposite said flat side, comprising first a porous support, first mold inserts on said support, said mold inserts being formed of resilient material, means for depositing wood fiber on said support around and on top of said mold inserts using a technique wherein said fibers are carried in a fluid and the fluid flows through the mat of fibers deposited on said mold inserts, a flat surfaced press member, means for pressing the mat onto the mold inserts and the support using said flat surfaced press member, and means for applying sufficient pressing force normal to said flat surface to deform said mold inserts and to squeeze out remaining fluid used in said flow deposition step, mold inserts configured to generate three-dimensional forming forces upon application of a solely normal force thereto, said mold insert deformation causing densification of said mat in directions parallel to and other than parallel to said pressing force.

4,702,871

METHOD FOR MELT-SPINNING THERMOPLASTIC POLYMER FIBERS

Katsumi Hasegawa; Michio Ohno, both of Kusatsu; Tadahito Nagayasu, and Kazuo Umeda, both of Nagoya, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Jun. 17, 1985, Ser. No. 745,676
Int. Cl.[4] D01D *5/092*
U.S. Cl. 264—101 **9 Claims**



1. A method for producing a yarn from a thermoplastic polymer with improved elongation, strength, and birefringence, comprising the steps of:

extruding a molten polymer through a spinneret as a filament yarn into a spinning tube disposed directly beneath said spinneret, the interior of said tube being kept at a pressure of not more than 0.7 atm;

cooling said filament yarn to solidify said filament yarn in said spinning tube; and

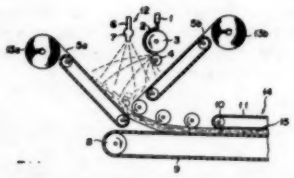
withdrawing said filament yarn from said spinning tube through a narrow groove having a cross-sectional area of not more than 4.0 mm^2, which groove is provided at the bottom of said spinning tube, and which groove allows a continuous passing-through of said filament yarn but maintains said reduced pressure in said spinning tube.

4,702,872

METHOD FOR MANUFACTURE OF FIBER REINFORCED THERMOSETTING RESIN MOLDING MATERIAL

Shigehiro Yamamoto, Matsubara; Terukuni Hashimoto, Itami; Mitsuo Kobayashi, Osaka; Tsugishige Iwaki, Takatsuki; Katsushige Tamura, Akashi, and Hideo Saijo, Suita, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Japan

Filed Apr. 26, 1985, Ser. No. 727,520
Claims priority, application Japan, Oct. 9, 1984, 59-210511
Int. Cl.[4] B05D *1/28*
U.S. Cl. 264—114 **11 Claims**



1. A method for the manufacture of a fiber reinforced thermosetting resin molding material, which comprises feeding a liquid thermosetting resin composition having a viscosity of between 100 and 10K poise To the surface of at least one transfer roller in rotation, causing said resin composition adhering to said surface to be spread in the form of particles by a spreading roller opposed across a gap to said transfer roller and rotated in the same direction as said transfer roller, said resin being sprayed substantially in the direction of rotation of said spreading roller, blowing a stream of reinforcing fibers substantially thru said spray path of said resin whereby said fibers are coated with said resin, allowing said resin-fiber mixture of pileup, and subsequently removing the entrapped air from the resultant pile thereby enabling said resin composition to wet out said reinforcing fibers in said pile.

4,702,873

METHOD OF MANUFACTURING A COMPOSITE INSULATOR

Alexandre Kaczerginski, Bellerive sur Allier, France, assignor to Ceraver, S.A., Paris, France

PCT No. PCT/FR84/00077, § 371 Date Oct. 30, 1984, § 102(e) Date Oct. 30, 1984, PCT Pub. No. WO84/03794, PCT Pub. Date Sep. 27, 1984
Continuation of Ser. No. 674,956, Oct. 30, 1984, abandoned. This PCT application Mar. 23, 1984, Ser. No. 868,159
Claims priority, application France, Mar. 25, 1984, 83 04914
Int. Cl.[4] B24C *45/14*
U.S. Cl. 264—135 **18 Claims**

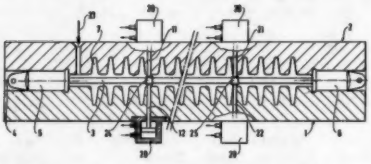
1. A method for molding an elastomeric insulating covering on a central rod of composite material to form an organic insulator, the method including applying adherization agents to the surface of the rod, placing the rod in a mold, injecting

hot-vulcanizable elastomeric material into the mold to form a covering around the rod, and hot-vulcanizing the elastomeric covering material, wherein the improvement comprises:

providing at least one protective sleeve around a corresponding at least one circumferential portion of the rod prior to placing the rod in the mold, the material of the sleeve being directly bondable to said hot-vulcanizable elastomeric material;

affixing the sleeve to the rod;

extending at least one retractable support into contact with each protective sleeve to support the sleeve and the rod in



spaced relation to the walls of the mold without damage to the adherization agents prior to injecting the hot-vulcanizable elastomeric material into the mold; and

retracting the at least one retractable support from contact with the sleeve at the end of injecting the elastomeric material into the mold so as to permit the injected elastomeric material to fill a void left by the withdrawn support before the elastomeric material is vulcanized, such that after hot-vulcanizing the elastomeric material, the sleeve is affixed to the rod and the elastomeric material adheres to the rod and to the sleeve.

4,702,874

MANUFACTURING METHOD OF RELEASE PAPER

Shuzo Ohara, Kawanishi, and Ryoichi Kitamura, Takaishi, both of Japan, assignors to Goyo Paper Working Co., Ltd., Osaka, Japan

PCT No. PCT/JP85/00323, § 371 Date Feb. 26, 1986, § 102(e) Date Feb. 26, 1986, PCT Pub. No. WO86/00564, PCT Pub. Date Jan. 30, 1986

PCT Filed Jun. 6, 1985, Ser. No. 835,854

Claims priority, application Japan, Jul. 2, 1984, 59-137544

Int. Cl.[4] B29C *47/88*

U.S. Cl. 264—171 **5 Claims**

1. A method of manufacturing a release paper comprising:

(1) extruding a mixture of a polyolefin resin A and a silicone release agent B compatible therewith onto a substrate to prepare a laminate, said silicone release agent comprising a reaction product obtained by reacting (a) a polymethyl hydrogen silicone, (b) a vinyl group-containing polydimethyl siloxane, and (c) at least one compound selected from the group consisting of olefins and polyefins having at least one double bond, said reaction being stopped at the start of gelling;

(2) heat treating the obtained laminate to cause the silicone release agent B contained in the extruded mixture of the polyolefin A and the silicone release agent B to bleed onto the surface of the mixture and thus become localized; and then

(3) curing the localized silicone release agent B to fix it.

4,702,875

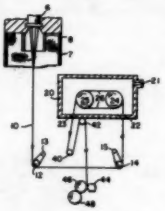
PROCESS FOR PRODUCING HIGH TENACITY POLYHEXAMETHYLENE ADIPAMIDE YARN HAVING RIBBON CROSS-SECTION

Uel D. Jennings, Signal Mountain, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 14, 1985, Ser. No. 745,059

Int. Cl.[4] D01D *5/092, 5/253*

U.S. Cl. 264—177.13 **2 Claims**



1. A process for preparing a polyhexamethylene adipamide yarn having ribbon cross-section filaments, said filaments having a cross-section of a length to width ratio of greater than about 3 and a tenacity of greater than about 4.5 g/den., comprising the steps of:

(a) melt spinning polyhexamethylene adipamide filaments through a rectangular spinneret orifice;

(b) quenching the filaments at a distance of greater than about 4 cm. after the filaments leave the rectangular spinneret orifice;

(c) combining the filaments into a yarn bundle;

(d) drawing the yarn bundle in a two-stage hot chest draw process;

(e) winding the yarn bundle;

wherein the length to width ratio of the rectangular spinneret orifice is greater than about 15, and wherein the spun filaments have an RV greater than about 50.

4,702,876

VARIABLE-APERTURE PROCESS FOR THE MANUFACTURE OF FILAMENTS FROM AROMATIC POLYAMIDES

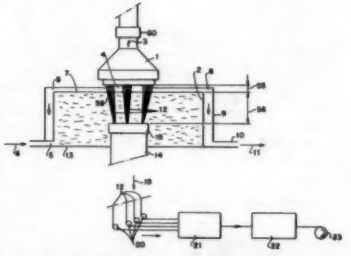
Johan L. Ebregt, and Hendrik Maatman, both of Arnhem, Netherlands, assignors to Akzo N.V., Netherlands

Filed Jul. 11, 1985, Ser. No. 754,364

Claims priority, application Netherlands, Jul. 11, 1984, 8402192

Int. Cl.[4] D01D *5/06*

U.S. Cl. 264—184 **18 Claims**



5. A method of air-gap spinning a plurality of distinct, separate synthetic fibers from an aromatic polyamide spinning mass, comprising

a. forming the spinning mass into a plurality of fibers;

b. passing the newly-formed fibers through an air-gap; and

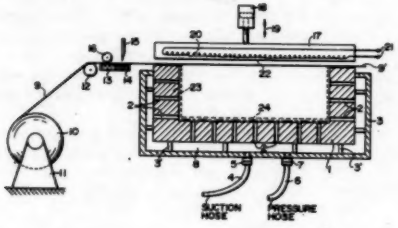
c. passing the fibers through a liquid, the liquid being held in a container, the container having an aperture for the withdrawal of the fibers, the aperture being opened to a first, large open area for beginning the spinning operation, including passing the initial spinning mass through the aperture to effect greater ease in stringing up said filaments and being reduced to a second, small open area to restrict the flow of the liquid through the aperture during the continuation of the spinning operation to form filaments of greater tenacity.

4,702,877

METHOD FOR MOLDING CONCRETE BLOCKS OR BRICKS

Lindsey B. Davis, Jr., Box 32, Cambridge, Me. 04923

Filed Dec. 31, 1985, Ser. No. 815,382
Int. Cl.[4] B28B *7/12*; B29C *33/46, 43/18, 51/10*
U.S. Cl. 264—553 **11 Claims**



1. In a method for molding concrete elements in an open top mold having a primary mold cavity defined by walls lined with a thermoplastic film which is first moved onto said open top of said mold, heated and sucked by vacuum into said primary mold cavity which is then filled with a concrete mix for the formation of the element, the improvement comprising the following steps:

(a) contacting at least that portion of said thermoplastic film which smoothly covers said open top, with a flat heater surface of a solid heating device for uniformly and entirely heating said portion of said thermoplastic film on said open top through said flat heater surface, while simultaneously closing said open top with said solid heating device, said heating softening said film portion sufficiently for pulling the heated film portion into said primary mold cavity by suction,

(b) evacuating said primary mold cavity while it is still closed by said heating device, sufficiently for lining the primary mold cavity with a secondary mold formed of said thermoplastic film in said primary mold cavity,

(c) removing the heating device for opening said secondary mold in said primary mold cavity,

(d) filling the secondary mold in said primary mold cavity with a concrete mix, and

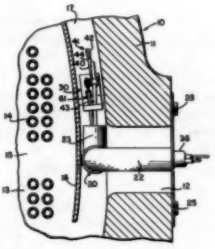
(e) compacting said concrete mix in said secondary mold while the seconsary mold is still in said primary mold and withdrawing the secondary mold filled with compacted concrete mix from said primary mold cavity prior to any substantially noticeable or effective hardening of said concrete mix in said secondary mold which together with the compacted but not yet effectively hardened concrete mix forms a unit sufficiently shape retaining for an immediate transportation and completing the curing and hardening of the concrete mix in said secondary mold outside said primary mold with the curing concrete mix a sufficiently shape retaining unit so that expansion forces resulting from the hardening and curing are substantially prevented from becoming effective in the primary mold and for permitting the renewed use of said primary mold cavity before the formed concrete mix hardens.

4,702,878

SEARCH AND RETRIEVAL DEVICE

Ralph W. Klug, Oakmont; Charles E. Toler, Penn Hills, and John A. Rylatt, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 15, 1986, Ser. No. 819,087
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—249 **8 Claims**



1. A device for searching and retrieving objects in a steam generator having an outer cylindrical shell, a horizontal tube sheet adjacent the lower end of said shell, a bundle of vertical tubes supported by said tube sheet, a wrapper barrel surrounding said tubes extending from the upper portion of said shell downwardly to a predetermined point above said tube sheet to form an annulus inside said shell and an opening through said shell to said annulus, said device comprising:

(a) a sled adapted to be passed through said shell opening and down said annulus to said tube sheet;

(b) a flexible tube connected at one end to said sled and having its other end extending out through said shell opening, said flexible tube being of sufficient length to be freely movable into and out of said shell opening to move said sled along said tube sheet;

(c) a probe and a gripper associated with said sled for searching and retrieving objects;

(d) adjusting means on said sled for changing the operating positions of said probe and said gripper;

(e) control means outside of said shell extending through said flexible tube for operating said probe, said gripper and said adjusting means;

(f) said control means comprising a probe cable attached to said probe, a gripper shaft attached to said gripper and a rotatable actuator cable connected to said adjusting means, said probe cable and said gripper shaft being slidably received within said flexible tube; and

(g) said adjusting means comprising a rotatable turret mounted on said sled and said probe cable and said gripper shaft being slidably connected to said turret.

4,702,879

NUCLEAR REACTOR WITH PASSIVE SAFETY SYSTEM

Stephen N. Tower, Washington Township, Westmoreland County, and Terry L. Schulz, Murrysville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 11, 1986, Ser. No. 872,985
Int. Cl.[4] G21C *13/00, 15/18*
U.S. Cl. 376—282 **14 Claims**

1. A nuclear reactor comprising:

a substantially cylindrical flow liner having an open top, a cylindrical wall section, and a bottom wall, said cylindrical wall section forming a lower reactor internals chamber;

an upright cylindrical barrel within said cylindrical wall section having a bottom support plate spaced from said bottom wall, forming a downcomer annular passage between the cylindrical wall section and said barrel, and an upright riser chamber within said barrel;

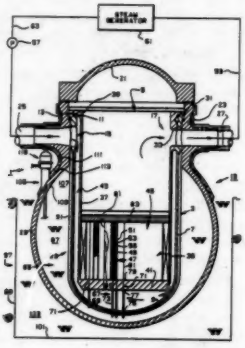
a lower internals portion in the cylindrical flow liner containing a nuclear core having at least one fuel assembly, comprising a plurality of elongated fuel rods containing nuclear fuel to provide a fission-type chain reaction, and a plurality of elongated control rod assemblies contained within elongated thimbles disposed between said fuel rods, located in the riser chamber of said barrel;

at least one hot primary coolant discharge means in said flow liner intermediate said lower internals portion and said open top;

at least one cooled primary coolant return means in said flow liner intermediate said lower internals portion and said open top;

means for circulating primary coolant, at an elevated pressure upwardly through said nuclear core and riser chamber for heating thereof and discharge therefrom, and cooled primary coolant downwardly through said downcomer;

a pressure vessel having an upper removable top, an intermediate cylindrical wall section and a lower wall section, enclosing said flow liner and lower internals portion, the lower wall thereof spaced from said flow liner to form a second annular chamber therebetween, and the intermediate cylindrical wall section thereof having at least one outlet nozzle communicating with said at least one discharge means in the flow liner, and at least one inlet nozzle



communicating with said at least one return means in the flow liner;

a supply of supplementary liquid coolant contained in said second annular chamber;

means communicating between said second annular chamber and said riser chamber for supplying supplementary liquid coolant directly to the nuclear core within said riser chamber;

means for cooling the major portion of said supplementary liquid coolant within said second annular chamber to a first elevated temperature; and

means for maintaining a localized minor portion of said supplementary liquid coolant at a second elevated temperature in excess of said first elevated temperature, and approximate that of coolant in said cooled primary coolant return means; whereby upon a decrease in the pressure of the primary coolant in said riser below a predetermined pressure, volatilization of said localized minor portion of supplemental liquid coolant is effected and the pressure increase resulting therefrom in said second annular chamber will feed remaining supplemental coolant through said means communicating between said second annular chamber to said nuclear core in said riser chamber.

11. A passive safety system for a pressurized water nuclear reactor wherein the reactor-vessel is contained in a shield building, with a heat-conducting containment shell situated in the shield building containing said reactor, at least one steam generator, a primary coolant circuit for the reactor having a hot leg and a cold leg, and with a pressurizer connected to said circuit for maintaining primary coolant therein at a predetermined pressure, comprising:

(a) a nuclear reactor having;

a substantially cylindrical flow liner having an open top, a cylindrical wall section, and a bottom wall, said cylindrical wall section forming a lower reactor internals chamber;

an upright cylindrical barrel within said cylindrical wall section having a bottom support plate spaced from said bottom wall, forming a downcomer annular passage between the cylindrical wall section and said barrel and an upright riser chamber within said barrel;

a lower internals portion in the cylindrical flow liner containing a nuclear core having at least one fuel assembly, comprising a plurality of elongated fuel rods containing nuclear fuel to provide a fission-type chain reaction, and a plurality of elongated control rod assemblies contained within elongated thimbles disposed between said fuel rods, located in the riser chamber of said barrel;

at least one hot primary coolant discharge means in said flow liner intermediate said lower internals portion and said open top;

at least one cooled primary coolant return means in said flow liner intermediate said lower internals portion and said open top;

means for circulating primary coolant, at an elevated pressure upwardly through said nuclear core and riser chamber for heating thereof and discharge therefrom, and cooled primary coolant downwardly through said downcomer;

a pressure vessel having an upper removable top, an intermediate cylindrical wall section and a lower wall section, enclosing said flow liner and lower internals portion, the lower wall thereof spaced from said flow liner to form a second annular chamber therebetween, and the intermediate cylindrical wall section thereof having at least one outlet nozzle communicating with said at least one discharge means in the flow liner, and at least one inlet nozzle communicating with said at least one return means in the flow liner;

a supply of supplementary liquid coolant contained in said second annular chamber;

means communicating between said second annular chamber and said riser chamber for supplying supplementary liquid coolant directly to the nuclear core within said riser chamber;

means for cooling the major portion of said supplementary liquid coolant within said second annular chamber to a first elevated temperature; and

means for maintaining a localized minor portion of said supplementary liquid coolant at a second elevated temperature in excess of said first elevated temperature, and approximate that of coolant in said cooled primary coolant return means; whereby upon a decrease in the pressure of the primary coolant in said riser below a predetermined pressure, volatilization of said localized minor portion of supplemental liquid coolant is effected and the pressure increase resulting therefrom in said second annular chamber will feed remaining supplemental coolant through said means communicating between said second annular chamber to said nuclear core in said riser chamber;

(b) means for circulating water solely by natural convection from said hot leg to said cold leg with circumvention of said steam generator including:

means for heat exchange, for cooling water flowing from said hot leg to said cold leg; and

valve means for allowing flow of water from said hot leg to said cold leg; and

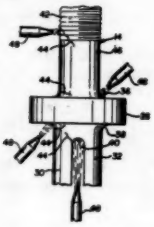
(c) further means for introducing stored coolant, under a superatmospheric pressure of gas, into the cylindrical vessel of said nuclear reactor.

4,702,880

PROCESS FOR IMPROVING RESISTANCE OF SPLIT PINS TO STRESS CORROSION CRACKING

Jan S. Porowski; Manu L. Badlani, both of Pittsburgh; William J. O'Donnell, Bethel Park, and Edward J. Hampton, Murrysville, all of Pa., assignors to O'Donnell & Associates, Inc., Pittsburgh, Pa.

Filed Jul. 7, 1986, Ser. No. 882,256
Int. Cl.[4] G21C 1/04
U.S. Cl. 376—305 20 Claims



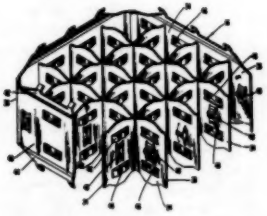
1. A process for improving resistance of control rod guide tube split pins, used in nuclear reactors, to stress corrosion cracking which comprises heating said split pin to an elevated temperature level, cooling at least the surfaces of said split pin endangered by stress corrosion cracking and therefore subject to stress corrosion cracking to a temperature below said elevated temperature and then permitting said split pin to come to ambient temperature, said elevated temperature level being below the characteristic temperature resulting in metallurgical change in the material of said split pin but at least an elevated temperature level such that the difference between said elevated temperature level and the temperature to which said surface is initially cooled is sufficient to result in plastic flow of said initially-cooled surface to a depth equivalent to at least one grain size.

4,702,881

NUCLEAR REACTOR SPACER GRID

Lynne E. Weiland, Richland, and Beryl H. Parks, Lexington, both of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 2, 1985, Ser. No. 719,107
Int. Cl.[4] G21C 3/34
U.S. Cl. 376—442 27 Claims



1. A nuclear fuel assembly containing a plurality of generally cylindrical fuel rods having an outside radius and comprising:

a top nozzle;

a bottom nozzle;

a control rod guide thimble extending between said top and bottom nozzles;

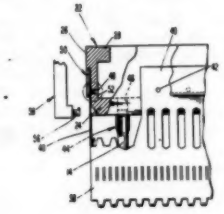
a plurality of fuel rod spacer grid assemblies axially disposed along said control rod guide thimble for maintaining the fuel rods in a space lateral array, each of said spacer grid assemblies comprising a plurality of grid straps interlocked into an egg-crate configuration to form cells through which said fuel rods pass, each of said cells having a grid spring and an opposing dimple, each of said grid spring and dimple having an arcuate surface portion contoured o generally conform, in both the axial and radial directions, to the surface of said generally cylindrical fuel rods and adapted to contact said fuel rods along at least a line of contact as the fuel rods pass through said cells, said arcuate portions having radius of curvature equal to or greater than the outside radius of said fuel rods.

4,702,882

QUICK DISCONNECT TOP NOZZLE FOR A NUCLEAR FUEL ASSEMBLY

David L. Stucker, Plum Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 4, 1985, Ser. No. 720,207
Int. Cl.[4] G21C 3/32
U.S. Cl. 376—446 21 Claims



1. In a fuel assembly having a top nozzle, a longitudinally extendign control rod guide thimble, and a spacer grid extending transversely about an upper regin of said fuel assembly an attaching structure for removably mounting the top nozzle on the fuel assembly comprising:

first means for transferring compressive loads on said fuel assembly through said top nozzle directly to said guide thimble;

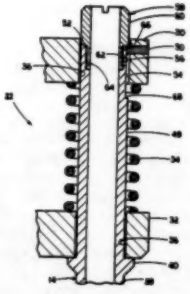
second means for transferring tensive loads on said fuel assembly through said top nozzle and said spacer grid to said guide thimble.

4,702,883

RECONSTITUTABLE FUEL ASSEMBLY HAVING REMOVABLE UPPER STOPS ON GUIDE THIMBLES

John F. Wilson, Murrysville Boro; David D. Seel, Monroeville, and James M. Pepka, Plum Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 5, 1985, Ser. No. 762,734
Int. Cl.[4] G21C 3/32
U.S. Cl. 376—446 6 Claims



1. In a nuclear fuel assembly having at least one control rod guide thimble and a top nozzle, said guide thimble including an upper extension member, said top nozzle including an upper hold-down plate having a passageway slidably receiving an

upper end portion of said extension member, an improved structure for removably attaching said upper hold-down plate on said guide thimble upper extension member, comprising:

(a) means defining a recess on said upper end portion of said extension member;

(b) a stop member having upper and lower portions, said stop member lower portion adapted to connect onto and disconnect from said extension member upper end portion, said stop member upper portion having an outside diameter greater than that of said stop member lower portion and extending above said extension member upper end portion when said stop member lower portion is connected onto the same, said stop member also having a ledge formed thereon at a transition between its upper and lower portions which defines an upper limit of said recess when said stop member is connected onto said extension member upper end portion; and

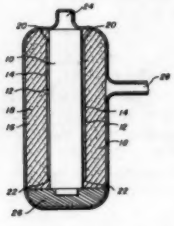
(c) an element mounted in said upper hold-down plate and extending therefrom into said passageway of said plate and said recess of said extension member upper end portion, said element being positioned to slide upwardly along said recess until making engagement with said ledge on said stop member when said stop member is connected onto said extension member upper end portion for limiting upward movement of said upper hold-down plate along said guide thimble, said element being positioned to slide upwardly along and past said recess when said stop member has been disconnected from said extension member upper end portion for allowing removal of said upper hold-down plate from said guide thimble.

4,702,884

GLASS-LINED PIPES

David Goldstein, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 3, 1986, Ser. No. 887,165
Int. Cl.[4] B22F *7/04*
U.S. Cl. 419—8 **6 Claims**



1. A method of producing a glass-lined metal pipe comprising:

(a) loading unconsolidated metal or metal alloy powder into a sealable glass mold comprising a graphite core, a glass sleeve slipped over the graphite core with a sliding fit, a sealable outer glass envelope surrounding the graphite core and glass sleeve and forming with them a sealable chamber for the metal or metal alloy powder, wherein the glass is a type which becomes plastic when heated;

(b) evacuating the atmosphere from the metal or metal alloy powder filled chamber in the mold;

(c) sealing the chamber;

(d) placing the mold in an open top refractory container and packing with free flowing refractory powder selected to freely flow at all the temperatures in the process;

(e) heating the mold and the metal or metal alloy contents of the mold to a temperature at which sintering of the metal or metal alloy powder takes place and holding at this temperature for a time sufficient to cause substantially complete densification of the powered metal or metal alloy, during which step the mold is supported by the free flowing refractory powder as the glass sleeve and the glass envelope become plastic and the mold shrinks in volume as its metal or metal contents densify putting pressure against the plastic glass sleeve which is compressed against the solid graphite core;

(f) cooling and removing the glass envelope portion of the mold to leave a composite article comprising the consolidated metal or metal alloy layer, a glass liner under compression from the consolidated metal or metal alloy layer, a very thin interfacial fused layer of glass and metal or metal alloy, and the graphite core; and

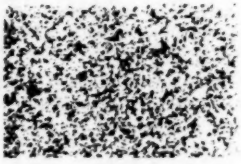
(g) removing the solid graphite core from the composite article produced in step (f) to produce the glass-lined metal or metal alloy pipe.

4,702,885

ALUMINUM ALLOY AND METHOD FOR PRODUCING THE SAME

Yusuke Odani; Kiyoaki Akechi, and Nobuhito Kuroishi, all of Itami, Japan, assignors to Sumitomo Electric Industries, LTD., Osaka, Japan

Continuation-in-part of Ser. No. 677,472, Dec. 3, 1984. This application Jun. 27, 1986, Ser. No. 879,704
Claims priority, application Japan, Dec. 2, 1983, 58-228968; Dec. 9, 1983, 58-233245; Jan. 7, 1984, 59-1090; Mar. 23, 1984, 59-56492
Int. Cl.[4] B22F *3/24*
U.S. Cl. 419—23 **27 Claims**



1. A method for producing aluminum alloy comprising the steps of:

(a) producing an aluminum alloy powder, said alloy powder consisting of 10 to 36 wt % of Si, 2 to 12 wt % of Fe, 2 to 10 wt % of at least one of metal selected from the group consisting of Ni, Co, Cr and Mn, the reminder consisting of aluminum;

(b) compressing the mass of said powder by compacting said powder, or accumulating said powder in a can, in the case of said compacting, said powder being compacted to have an actual density ratio of 65% to 90%, and in the case of said accumulation, said powder being compressed to have an actual density ratio of not more than 90%;

(c) heating said compressed mass of powder in a convection type heating furnace at a temperature of 250° C. to 550° C. for 5 to 20 hours; and

(d) hot extrusion-working said mass of powder at an extrusion ratio of not less than 4 : 1, without cooling the resulting heated compressed mass of powder to produce an aluminum alloy product.

4,702,886

CORROSION RESISTANT NICKEL ALLOYED DUCTILE CAST IRON OF FERRITE STRUCTURE

Randy K. Kent, Federal Way, Wash., assignor to Romac Industries Inc., Seattle, Wash.

Filed Oct. 9, 1986, Ser. No. 916,819
Int. Cl.[4] C22C *37/00, 37/04*
U.S. Cl. 420—18 **3 Claims**

1. A corrosion resistant nickel alloyed ductile cast iron that

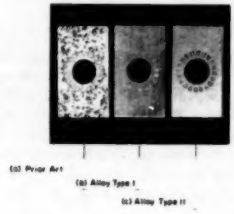
maintains the primary ferritic phase, wherein nickel is added in selected amounts, within a range from 0.2 to 2.0% by weight, having improved corrosion resistance, as determined through electrochemical tests, and the remaining composition being of common ductile cast iron, including approximately by weight; 2.5–4.0% carbon, 1.7–4.0% silicon, up to 1.0% manganese, 0.01–0.10% magnesium, up to 0.5% copper, up to 0.1% phosphorus, up to 0.7% chromium, up to 0.01% sulphur, up to 1.0% molybdenum, trace amounts of rare earths and other elements, with the remainder being iron the primary ferritic phase, having primary graphite structure of spheres, thus producing a low cost corrosion resistant ductile cast iron.

4,702,887

CORROSION RESISTANT CASTING ALLOY FOR WEAR

John A. Larson, Easton, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Feb. 27, 1986, Ser. No. 833,556
Int. Cl.[4] C22C *19/05*
U.S. Cl. 420—442 **7 Claims**



1. A nickel based corrosion and wear resistant alloy consisting of the following range of chemistry:

	C	Mn	Si	P	S	Cr
% MIN.	—	—	—	—	—	20.0
% MAX.	0.08	1.0	1.0	0.03	0.03	25.0

	Mo	Fe	Al	Ti	Bi	Sn	Sb	Ni
% MIN.	6.0	—	—	—	2.0	2.0	1.0	—
% MAX.	10.0	5.0	0.4	0.4	5.0	5.0	3.0	Balance

4,702,888

STIRRED MICROREACTOR

Ronald R. Borgialli, Laramie, Wyo., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

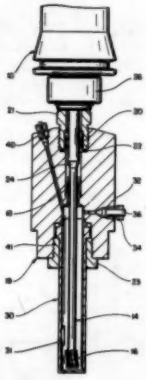
Continuation of Ser. No. 510,072, Jun. 30, 1983, abandoned.
This application Jul. 9, 1985, Ser. No. 753,351
Int. Cl.[4] B01F *7/20, 15/06;* **B01L** *3/00;* **G01N** *31/00*
U.S. Cl. 422—50 **1 Claim**

1. A batch-type, movable stirred microreactor for reacting a batch mixture of solid coal, liquid solvent and gaseous hydrogen at temperatures of 600°–900° F. in about two to five minutes, the microreactor comprising

a sealed pressure vessel for holding reactants and having formed therein a first port for insertion of means for continuously monitoring temperature within said vessel, a second port means for feeding hydrogen into said pressure vessel to adjust the internal hydrogen pressure and a third port,

a shaft extending into the pressure vessel through the third port, means for driving the shaft attached externally of said vessel,

an impeller positioned within said vessel and attached to and driven by the shaft for stirring reactants in the vessel, the impeller comprising a plurality of substantially vertical vanes attached to and surrounding said shaft, baffle means mounted above the impeller for breaking up a vortex in fluid motion around the shaft, and



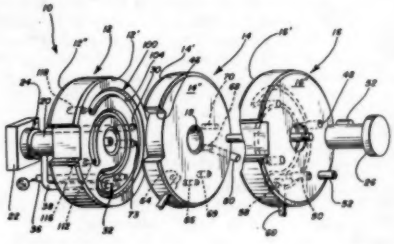
means for selectivity raising and lowering said microreactor into and out of a temperature controlled bath for controllably causing heating and cooling of a batch mixture contained therein within a desired time period.

4,702,889

LIQUID SAMPLING VALVE

Pedro P. Cabrera, Miami; Humberto A. Berra, Carol City, and Edward N. Doty, Pompano Beach, all of Fla., assignors to Coulter Electronics Inc., Hialeah, Fla.

Filed Jan. 16, 1986, Ser. No. 819,381
Int. Cl.[4] G01N *1/20;* **F16K** *21/02, 23/00*
U.S. Cl. 422—103 **11 Claims**



1. In a liquid diluting and transfer valve assembly of the type which includes at least a pair of valve elements, each being frictionally movable one relative to the other and having faces slidably engaged for such frictional movement, each valve element having axial measuring and segmenting passageways therethrough arranged for selective communication when at least one valve element is rotated, the junction of said passageways being at the said faces, the improvement comprising a continuous channel formed in one of said faces along a path extending substantially along the periphery of said face but spaced inwardly thereof, said channel being non-interferent with any of the passageway openings and being spaced from and not in normal operative communication with said passageways, said channel capable of intercepting any liquid traversing the faces, said channel having an inlet, an outlet and bore means formed in said valve means communicating with said inlet and outlet and capable respectively of receiving and discharging rinse liquid from a source thereof, flushing said channel of any material accumulating therein, said channel

being in substantially constant communication with said inlet and said outlet.

4,702,890

MIXING HEAD FOR MIXING TWO OR MORE PLASTICS COMPONENTS WHICH REACT TO FORM FOAM, IN PARTICULAR POLYURETHANE

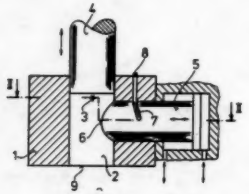
Josef Wallner, Holzkirchen, Fed. Rep. of Germany, assignor to Elastogran Maschinenbau GmbH, Strasslach, Fed. Rep. of Germany

Filed Dec. 18, 1985, Ser. No. 810,167

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446818

Int. Cl.⁴ B01F *5/04, 15/02;* **B01J** *14/00*

U.S. Cl. 422—133 **3 Claims**



1. A mixing head for a plurality of plastic components which react to form a foam, said mixing head comprising a housing having a mixing chamber and defining therein a circular cross-sectional flow area, a purging plunger in said mixing chamber and movable along an axis of said mixing chamber, inlets orifice means for supplying plastic components to said mixing chamber, flow restrictor means disposed at an angle to the mixing chamber axis, means for positioning said flow restrictor in a first position such that the restrictor extends into said mixing chamber and restricts the cross-sectional flow area of the mixing chamber and for positioning the flow restrictor in a second position such that the cross-sectional flow area is unrestricted, said flow restrictor means being located downstream of the inlet orifice means and having a front face whose contour matches that of the mixing chamber, and means for rotating said restrictor means 90° relative to an axis of the restrictor means during its movement into said first position.

4,702,891

FLUID FLOW DISTRIBUTION SYSTEM FOR FLUIDIZED BED REACTOR

Allen S. Li, Morristown, and Richard M. Eccles, Princeton, both of N.J., assignors to HRI, Inc., Lawrenceville, N.J.

Continuation of Ser. No. 416,428, Sep. 9, 1982, abandoned. This application May 3, 1985, Ser. No. 730,253

Int. Cl.⁴ B01J *8/20*

U.S. Cl. 422—140 **13 Claims**

1. A system for providing a uniform flow distribution of a fluid material upwardly into an ebullated bed of a reactor, said system comprising:

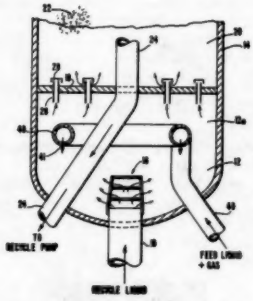
(a) a reactor vessel having at least one side wall and a lower end,

(b) a plenum provided in a lower part of the reactor and defined by the reactor lower end, the at least one side wall and by a distribution grid located below and supporting an ebullated bed in the reactor, said distribution grid containing a plurality of

vertical tubes each having an upper end which is covered by a cap for upward fluid flow uniformally therethrough into the ebullated bed;

(c) a conduit having a first end which extends upwardly into said plenum for carrying a flowable fluid material into the plenum, said conduit having an inner diameter; and

(d) a baffled nozzle rigidly attached to the first end of said conduit, said baffled nozzle being directed upwardly and extending into said plenum so as to be spaced below said distribution grid by a distance equal to 2.5–9 times the inner diameter of said conduit; said baffled nozzle having at least two baffles spaced apart from each other, a downstream innermost baffle consisting of a solid plate, and at least one upstream baffle, each of said upstream baffles



having a central opening smaller than said conduit and being located upstream of the downstream baffle, whereby said baffled nozzle mixes a gas and a liquid material fed through said conduit into said plenum and is arranged in combination with said distribution grid to effect a substantially uniform mixing and flow distribution of the gas/liquid mixture upwardly into said ebullated bed.

4,702,892

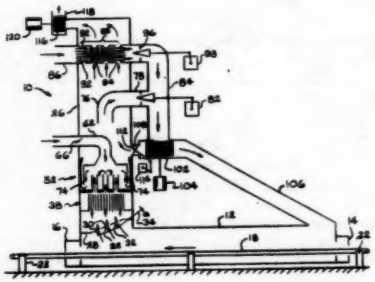
HEAT RECUPERATIVE CATALYTIC OXIDATION DEVICE

Erwin C. Betz, 524 Mill Valley Rd., Palatine, Ill. 60067

Filed Jul. 25, 1985, Ser. No. 759,475

Int. Cl.⁴ B01D *50/00, 53/36*

U.S. Cl. 422—171 **19 Claims**



1. A catalytic oxidation assembly comprising, in combination:

a preheater;

catalyst means having an inlet duct communicating with said preheater, a catalyst, and an outlet;

a recirculation duct having an inlet communiating with said catalyst means outlet, and an outlet;

gas moving means having an inlet, a first outlet, and a second outlet;

means for providing communication between said gas moving means inlet and said recirculation duct outlet, and means for providing communication between said gas moving means first outlet and said recirculation duct inlet;

an ambient air preheat exchanger having first and second passageways in thermal communication with each other,

means for providing communication between the ambient and said gas moving means inlet, which includes said first passageway, and means for providing communication between said catalytic heat generator means outlet and the ambient which includes said second passageway;

return means for providing communication between said gas moving means second outlet and said preheater; and

exhaust means for providing communication between said catalyst means outlet and the ambient.

4,702,893

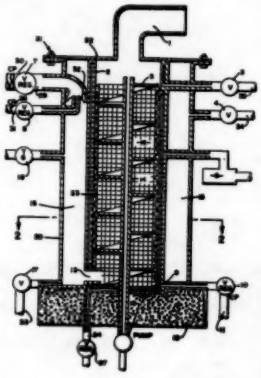
ACID AIR POLLUTION PRECIPITATORS

Samuel A. Kirk, Box 65, Pringle, S. Dak. 57773; Clair F. Kirk, 856 Pine St., Wheatland, Wyo. 82201; John W. Kirk, Box 65, Pringle, S. Dak. 57773, and Douglas J. Kirk, 3190 Cabrillo Dr., Tracy, Calif. 95376

Filed Jun. 27, 1985, Ser. No. 749,389

Int. Cl.[4] C01B *17/04*

U.S. Cl. 422—173 **2 Claims**



1. A precipitator for the elimination of sulfur dioxide from furnace or smelter emissions and for the production of sulfur, comprising:

(a) a cylindrical shell;

(b) an annular steam jacket positioned within said cylindrical shell to define an annular reaction chamber between said shell and said steam jacket, and to define a cylindrical separation chamber within said steam jacket;

(c) an emission inlet tube positioned and arranged so as to deliver the emissions to said reaction chamber, wherein said emission inlet tube has a flared end that is turned downward within said reaction chamber;

(d) a reactant inlet tube positioned and arranged so as to deliver producer or natural gas to said reaction chamber, wherein said reactant inlet tube has an end which is positioned in said flared end of said emission inlet tube so as to provide counter current mixing of the producer or natural gas and the emissions to produce sulfur particles;

(e) a tangential duct extending through said steam jacket so as to pass the emissions therethrough from said reaction chamber to said separation chamber;

(f) a spiral involuted baffle positioned and arranged within said separation chamber so as to centrifugally pass the emissions through said separation chamber;

(g) an annular grid positioned between said steam jacket and an outer edge of said baffle whereby the sulfur particles melt and coalesce so that liquid sulfur can be withdrawn from said precipitator;

(h) an outlet conduit which is positioned in said separation chamber for the withdrawal of the liquid sulfur; and

(i) a gas outlet tube positioned in said separation chamber to vent the emissions after treatment in said precipitator.

4,702,894

HYDROGEN SUPPLY UNIT

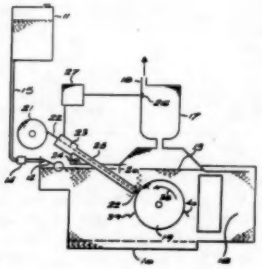
Francois P. Cornish, "Uitentuis", Steynsrus Road, Somerset West, Cape Province, South Africa

Continuation of Ser. No. 790,361, Oct. 23, 1985, abandoned, which is a continuation of Ser. No. 332,803, Dec. 21, 1981, abandoned. This application Jan. 7, 1987, Ser. No. 4,310

Claims priority, application South Africa, Dec. 22, 1980, 80/8007

Int. Cl.[4] B01J *19/08*

U.S. Cl. 422—186.26 **7 Claims**



1. Apparatus for generating hydrogen comprising:

a tank for containing water;

a first metal element and a second metal element disposed in said tank;

a metal surface of said first metal element being disposed adjacent to a metal surface of said second metal element with the metal substrates of both surfaces being in an electrical circuit to form respective positive and negative electrodes between which an electrical discharge may be made to take place;

means for moving said metal surface of said first metal element continuously toward said metal surface of said second metal element;

means for providing a current in said electrical circuit which includes said metal surfaces of sufficient intensity such that an electrical discharge between said positive and negative electrodes occurs causing the metal of at least one of said electrodes to react with water in the vicinity thereof resulting in the formation of a metal oxide and the generation of hydrogen; and

means for collecting the generated hydrogen.

4,702,895

PURIFICATION OF MOLYBDENUM

Michael J. Cheresnowsky, Towanda; Timothy A. Brunelli, Wyalusing, and Tai K. Kim, Towanda, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 2, 1986, Ser. No. 859,290

Int. Cl.[4] C01G *39/00*

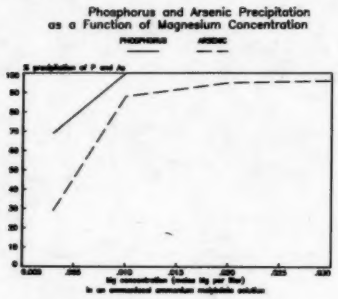
U.S. Cl. 423—54 **10 Claims**

1. A method for purifying molybdenum comprising:

(a) adding to an ammoniacal ammonium molybdate solution which is at a pH of from about 8.5 to about 11 and which contains the impurities of phosphorus and arsenic with the phosphorus concentration being from about 0.01 to about 0.12 g/l, a soluble magnesium salt to form a precipitate comprising magnesium ammonium salts of said phosphorus and said arsenic, and to form a purified ammonium molybdate solution, with the amount of said magnesium salt being added in an amount sufficient to result in a

concentration of from about 0.005 to about 0.04 moles Mg/l in said ammoniacal ammonium molybdate solution, and said purified solution containing no greater than about 0.01 g P/l;

(b) separating said precipitate from said purified ammonium molybdate solution; and



(c) contacting said purified ammonium molybdate solution with a chelating cation exchange resin supplying a sufficient amount of ammonium as the cation to remove the major portion of the magnesium ions from said purified solution and form a further purified ammonium molybdate solution.

4,702,896

THERMAL TREATMENT OF PHOSPHATE ROCK

Alexander D. Mair, Florence, Ala., assignor to Tennessee Valley Authority, Muscle Shoals, Ala.

Continuation-in-part of Ser. No. 648,412, Sep. 10, 1984, now Defensive Publication No. T105,602. This application Sep. 2, 1986, Ser. No. 902,721

Int. Cl.[4] C01B *25/16*

U.S. Cl. 423—167 **19 Claims**

1. An improved process for double-stage calcining organic matter contaminated phosphatic apatite rock of the mineral class generally known as francolites, said improved process resulting in the effecting of an intermediate phosphate rock calcine in a form eminently suitable for the subsequent acidulation thereof to wet-process phosphoric acid, said improved process resulting in substantially minimizing requirements for application of external energy thereto, and said improved process comprising:

(a) initially thermally treating said rock within the temperature range of 340° C. to 410° C. for a period of time ranging from 30 to 120 minutes, said rock characterized by having as the amount of organic matter thereof, before thermal treatment thereof, of at least one-half of one percent, expressed as organic carbon, by weight of the phosphate mineral in said feed rock; and

(b) subsequently thermally treating the resulting initially thermally treated rock within the temperature range of 640° C. to 710° C. for a period of time ranging from 5 to 40 minutes;

said improved process characterized by the fact that said double-stage calcining of said organic matter contaminated phosphatic apatite rock is effected in such a manner so as to produce therefrom a resulting calcined phosphate rock product having substantially all the congeneric organic matter eliminated therefrom, having acid-evolved sulfide formation therefrom substantially minimized, and maintaining a substantial porosity thereof to thereby effect a surface area of at least 2 m^2/g.

4,702,897

LEAD-TOLERANT CATALYST SYSTEM AND METHOD FOR TREATING EXHAUST GAS CONTAINING LEAD COMPOUNDS

Isik Onal, Arlington Heights, Ill., assignor to Signal Applied Technologies, Inc., La Jolla, Calif.

Division of Ser. No. 662,733, Oct. 19, 1984, Pat. No. 4,572,904, which is a continuation-in-part of Ser. No. 536,416, Sep. 27, 1983, abandoned. This application Sep. 30, 1985, Ser. No. 781,551

Int. Cl.[4] B01D *53/36*

U.S. Cl. 423—213.5 **4 Claims**

1. A method for effecting oxidation of noxious exhaust gases comprising hydrocarbons, carbon monoxide and lead compounds, said method comprising contacting said gases at oxidation conditions with a catalytic composite consisting essentially of a honeycomb ceramic or metallic carrier having deposited thereon an alumina support layer, said alumina layer having deposited thereon a platinum catalytic component and having dispersed immediately thereover a protective layer of zirconia.

4,702,898

PROCESS FOR THE REMOVAL OF ACID GASES FROM GAS MIXTURES

Bhadra S. Grover, Pound Ridge, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Oct. 17, 1986, Ser. No. 920,277

Int. Cl.[4] C01B *17/02, 17/16, 31/20*

U.S. Cl. 423—220 **14 Claims**

1. In a cyclic process for the removal of acid gases from a feed gas by means of an aqueous alkaline scrubbing solution which is continuously recycled between an absorption zone in which said acid gases are absorbed by said scrubbing solution to form a rich scrubbing solution and a regeneration zone in which said acid gases are desorbed from said rich scrubbing solution to form a lean solution, the improvement which comprises regenerating the rich solution in a regeneration zone which comprises (1) a steam stripping section and (2) and a flashing section containing at least one flashing stage and an acid gas stripping stage wherein:

(a) a first portion of the rich scrubbing solution is passed through the steam stripping section wherein it is regenerated to form a lean solution which is recycled to the absorption zone and a vapor stream containing removed acid gases and steam;

(b) a second portion of the rich scrubbing solution is passed through a flashing stage in which the rich scrubbing solution is flashed to remove acid gases and steam therefrom to form a partially regenerated solution;

(c) the partially regenerated solution is passed through the acid gas stripping stage in which the partially regenerated solution is countercurrently contacted with and stripped by the vapor stream from the steam stripping section to remove acid gases and steam from the partially regenerated solution; and

(d) the lean scrubbing solution leaving the steam stripping section is utilized to heat the partially regenerated solution in the flashing section to thereby form steam which strips additional acid gases from the partially regenerated solution.

4,702,899

PROCESS FOR TREATING COAL TO REDUCE SULFUR CONTENT IN FLUE GASES PRODUCED BY COAL COMBUSTION

Virgil J. Barczak; Roger A. Baldwin, both of Oklahoma City, and Paul R. Graham, Edmond, all of Okla., assignors to Kerr-McGee Coal Corporation, Oklahoma City, Okla.

Continuation-in-part of Ser. No. 425,263, Sep. 28, 1982, abandoned. This application Jul. 25, 1986, Ser. No. 889,162
The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.
Int. Cl.[4] B01J 8/00; C01B 17/00
U.S. Cl. 423—244 8 Claims

1. A process for reducing the gaseous sulfur oxide content of flue gases comprising the steps of:

burning in a combustion zone coal containing weakly bound cations of one of the alkali metal and alkaline earth metals or conbinations thereof in ion exchangeable form thereby producing flue gases, the burning of such coal in the combustion zone causing a substantial portion of the sulfur dioxide in the coal to be converted to sulfates in a residue in the combustion zone thereby reducing the amount of gaseous sulfur dioxide in the flue gases produced in the combustion zone;

recovering the sulfate containing residue from the combustion zone;

contacting at least a portion of the flue gases with coal containing weakly bound cations of one of the alkali metal and alkaline earth metals or combinations thereof in ion exchangeable form in a scrubbing zone to sorb a portion of the sulfur dioxide in the contacted flue gases on the coal, in the presence of water to maintain, during such contacting, a relatively high moisture content, the moisture content in the coal being from at least about 5% to about 60% by weight; and

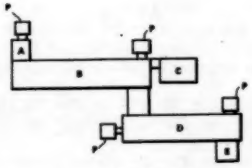
combusting in the combustion zone the coal contacted by the flue gases in the scrubbing zone.

4,702,900

METHOD OF PRODUCING SILICON CARBIDE

Yasuo Kurachi, Kodaira; Katsuhiko Arai, Iruma; Hiroaki Wada, Tokyo; Yoji Watabe, Hachioji, and Sanae Irako, Higashimurayama, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Apr. 8, 1986, Ser. No. 849,281
Claims priority, application Japan, Apr. 8, 1985, 60-73719; Oct. 23, 1985, 60-236948
Int. Cl.[4] C01B 31/36
U.S. Cl. 423—345 9 Claims



1. A method for producing substantially pure β-silicon carbide powder having a crystallite size of at least 500 Å, which comprises:

heating a mixture containing siliceous material and carbonaceous material having a C/Si atomic ratio of $2.1 \leqq C/Si \leqq 3.0$ in a non-oxidizing atmosphere at a temperature of about 1750° C. to 2100° C. in a reaction furnace having a separate chamber disposed laterally to the reaction furnace; and

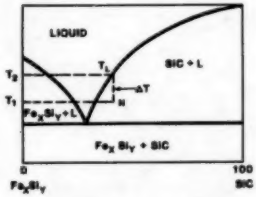
removing by-product gases containing impurities from the reaction chamber and introducing them into the laterally disposed separate chamber during said heating step thereby obtaining in the reaction chamber substantially pure β-silicon carbide powder having a crystallite size of at least 500 Å in which impurities contained in the by-product gases are removed from the reaction chamber.

4,702,901

PROCESS FOR GROWING SILICON CARBIDE WHISKERS BY UNDERCOOLING

Peter D. Shalek, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 12, 1986, Ser. No. 839,302
Int. Cl.[4] C01B 31/36
U.S. Cl. 423—346 9 Claims



1. A method of manufacturing β silicon carbide whiskers which comprises heating a reaction system consisting of a silicon source, a carbon source, and a catalyst in a reducing atmosphere whereby said reaction system is first heated beyond the whisker growth temperature and then said reaction system is cooled to a temperature to or below the growth temperature to induce nucleation at catalyst sites at a desired point in time, before being held at the growth temperature for the growth period.

4,702,902

HANDLING OF BY-PRODUCT GASES FROM A SILICON FURNACE

Vishu D. Dosaj; John D. Oleson, both of Midland, Mich., and Gary N. Bokerman, Madison, Ind., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 856,996, Apr. 29, 1986, abandoned. This application Mar. 25, 1987, Ser. No. 30,654
Int. Cl.[4] C01B 33/02
U.S. Cl. 423—350 19 Claims

1. In a process for the carbothermic reduction of silicon dioxide to form silicon, said process comprising passing electrical energy into a reaction zone of a silicon furnace, feeding silicon dioxide and a solid reducing agent into the reaction recovering molten silicon from the reaction zone, and handling by-produced gases from the reaction zone, the improvement comprising

(A) operating a silicon furnace in a closed mode at a pressure at or above atmospheric pressure;

(B) simultaneously feeding and controlling the proportions of (i) the by-produced gases, including silicon-containing materials, from the silicon furnace and (ii) a cooling medium selected from a group consisting of (a) a vaporizing liquified hydrocarbon-containing gas and (b) a compressed hydrocarbon-containing gas which is allowed to expand to facilitate cooling, to a means for contacting (i) and (ii):

(C) contacting the by-produced gases from the silicon furnace with the cooling medium to cool the by-produced gases, and to cause the silicon-containing materials to completely condense and to form agglomerated, solid silicon-containing material; and

(D) passing the resultant stream of gases and agglomerated, solid silicon-containing material from (C) through a means for removing the agglomerated, solid silicon-containing material.

4,702,903

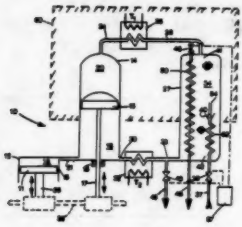
METHOD AND APPARATUS FOR GAS SEPARATION AND SYNTHESIS

Bowie G. Keefer, 4324 West 11th Avenue, Vancouver, British Columbia, Canada V6R 2M1

Continuation-in-part of Ser. No. 538,370, Oct. 3, 1983, abandoned. This application May 23, 1986, Ser. No. 866,395

Int. Cl.[4] C01C *1/04*; B01D *53/04*

U.S. Cl. 423—359 54 Claims



1. A process for separating components of a gas mixture containing first and second components, the process including the steps of:

(a) providing a working volume having a flow path for the gas mixture,

(b) providing in the flow path an adsorbent material within an adsorbent bed and a thermal regenerator to cooperate with the adsorbent bed to produce an adsorbent/regenerator combination,

(c) providing in the flow path first and second spaces disposed adjacent opposite ends of the adsorbent/regenerator combination, and maintaining the spaces at different temperatures so as to expose the regenerator combination to a thermal gradient,

(d) introducing the gas mixture into the working volume, the first component of the gas mixture being more readily adsorbed in the adsorbent material then the second component, and cyclically reversing direction of flow of the gas mixture along the flow path, including the adsorbent/regenerator combination and the first and second spaces in series therewith, so that direction of the flow alternates between opposite ends of the flow path,

(e) cyclically varying the total pressure of the gas mixture between upper and lower pressure limits within the working volume, so as to subject the gas flow to cyclical reversals of pressure, temperature and direction flow, and simultaneously co-ordinating a phase relationship between the cyclic pressure variations and the cyclic flow reversals relative to the adsorbent bed, such that the first component is preferentially adsorbed and immobilized by increased pressure on the adsorbent bed when the gas flows in one direction, and the first component is preferentially desorbed when the pressure is decreased and the flow is reversed,

(f) removing from adjacent one end of the adsorbent bed a first gas fraction enriched in the first component, and removing from adjacent the opposite end of the adsorbent bed a second gas fraction depleted in the first component, while also achieving conversion between thermal energy and compression energy in the gas mixture.

32. An apparatus for separating first and second gas components from a gas mixture, the apparatus including:

(a) a body having an internal working volume having first and second spaces, and a flow path interconnecting the first and second spaces,

(b) an adsorbent bed and a thermal regenerator provided in the flow path, the bed containing an adsorbent material which is selectively more adsorbent of the first component than the second component, the thermal regenerator cooperating with the adsorbent bed to produce an adsorbent/regenerator combination to receive gas flow which passes along the flow path,

(c) means to maintain the first and second spaces at different temperatures so as to expose the regenerator combination to a thermal gradient,

(d) inlet means to admit the gas mixture into working volume, and outlet means to discharge gas from adjacent opposite ends of the adsorbent bed,

(e) volume displacement means associated with the first and second spaces, and reciprocating means cooperating with the volume displacement means so as to reciprocate the volume displacement means within the body to produce cyclic variations in total pressure and cyclic reversals in direction of flow of the gas past the adsorbent bed, the reciprocating means determining a phase relationship between the cyclic variations of pressure in the gas and directions of flow of the gas,

so that the gas flow along the flow path is subjected to cyclical reversals of temperature combined with cyclical reversals of pressure and direction of flow so that flow of a first gas fraction under reduced pressure past the adsorbent bed towards one space is enriched in the first more readily adsorbed component, while reverse flow of a second gas fraction under increased pressure past the adsorbent bed towards the opposite space is depleted in the first more readily adsorbed component.

4,702,904

ORAL COMPOSITION CONTAINING ZIRCONIUM-BONDED SYNTHETIC AMORPHOUS SILICATE

Tsutomu Maeyama, Chiba; Kenji Kaneko, and Shigeru Ishii, both of Tokyo, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Nov. 20, 1985, Ser. No. 800,143

Claims priority, application Japan, Dec. 28, 1984, 59-277810

The portion of the term of this patent subsequent to Apr. 29, 2003, has been disclaimed.

Int. Cl.[4] A61K *7/18, 7/16*

U.S. Cl. 424—52 14 Claims

1. An oral composition comprising:

1 to 50% by weight of the composition of a zirconium-bonded synthetic amorphous silicate with a zirconium content of 0.1 to 10% by weight as ZrO_2 based on SiO_2 as an abrasive, and a fluoride compound selected from the group consisting of alkali metal fluoride, alkali metal monofluorophosphate and stannous-containing fluoride compound, with a fluoride content of 50 to 10,000 ppm based on the total composition.

4,702,905

PACKAGED DENTAL CREAM

Robert L. Mitchell, Somerset, and Michael A. Kiernan, Howell, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 30, 1985, Ser. No. 771,378

Int. Cl.[4] A61K *7/16, 7/26*

U.S. Cl. 424—57 10 Claims

1. A packaged dental cream wherein said dental cream is in direct contact with a low or medium density polyethylene or polypropylene surface, wherein syneresis occurs in said dental cream due to said direct contact when said dental cream comprises as ingredients as aqueous vehicle comprising a liquid vehicle comprising about 10–50% by weight of water and glycerine and sorbitol, the amount of glycerine and sorbitol together being about 15–50% by weight, the weight ratio of glycerine to sorbitol being from about 0.25:1 to about 3:1, a dental cream solid vehicle comprising about 0.05–10% by weight of a dental cream gelling agent selected from the group consisting of Irish Moss, gum tragacanth, sodium carboxymethyl cellulose, hydroxyethyl cellulose, polyvinyl pyrrolidone, sodium alginate, guar gum, starch, xanthan and iota carrageenan, and about 20–75% by weight of a dentally ac-

ceptable water-insoluble calcium or magnesium alkaline earth metal salt polishing agent; said dental cream comprising said ingredients and as an additive which prevents syneresis in said dental cream upon said direct contact polyethylene glycol of average molecular weight of about 200–1000, the weight ratio of the total amount of glycerine and sorbitol to said polyethylene glycol being from about 60:1 to about 6:1.

4,702,906

COSMETIC AGENTS BASED ON POLYCATIONIC POLYMERS, AND THEIR USE IN COSMETIC COMPOSITIONS

Bernard Jacquet, Antony; Gérard Lang, Epinay-sur-Seine; Alain Malaval, Aulnay-Sous-Bois; Serge Forestier, Claye Souilly, and Do Le Trung, Drancy, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

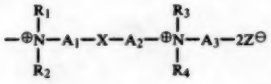
Division of Ser. No. 534,366, Sep. 21, 1983, Pat. No. 4,517,174, which is a division of Ser. No. 217,411, Dec. 17, 1980, Pat. No. 4,411,884. This application May 13, 1985, Ser. No. 733,590

Claims priority, application France, Dec. 21, 1979, 79 31431

Int. Cl.[4] A45D *7/00;* **A61K** *7/06, 31/74*

U.S. Cl. 424—70 **5 Claims**

1. A shampoo composition comprising an aqueous solution of a quaternized polymer containing units of the formula

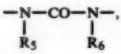


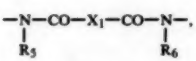
wherein

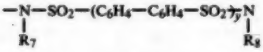
R_1, R_2, R_3 and R_4 each independently represent a hydrocarbon group, or at least one of the pairs R_1, R_2 and R_3, R_4 represents together with the nitrogen atom to which it is attached a heterocycle optionally containing an oxygen or sulfur heteroatom;

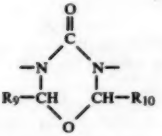
A_1 and A_2, each independently, represent linear or branched alkylene or arylene, substituted or not, containing up to 20 carbon atoms;

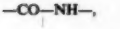
X represents a bivalent group of the formula

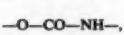
 (a)

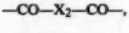
 (b)

 (c)

 (d)

 (e)

 (f)

 (g)

 (h)

 (i)

or

 (j)

wherein

y is equal to 0 or 1,

R_5, R_6, R_7, R_8, R_9 and R_{10} represent hydrogen or lower alkyl,

X_1 represents alkylene, alkylene including an —S—S— group, alkenylene, arylene, diaminoalkylene, diaminoarylene, dioxyalkylene, dioxyarylene or polyoxyalkylene, or X_1 represents a direct covalent bond,

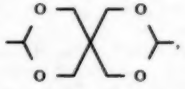
X_2 represents diaminoalkylene, dioxyalkylene or polyoxyalkylene bivalent group,

X'_2 represents dithioalkylene,

X_3 represents alkylene, cycloalkylene, arylene, diaminoalkylene, diaminocycloalkylene or diaminoarylene,

A_3 represents $—B_1—Y—B_2$, wherein B_1 and B_2 represent alkylene or arylene and Y has the same meaning as X above, or

Y represents



or

A_3 is a linear or branched alkylene group

(1) substituted by at least one =O group, or

(2) interrupted by at least one heteroatom or heteroatom group of oxygen, sulfur or nitrogen, or

(3) interrupted by at least one arylene, or

(4) substituted by at least one =O group and interrupted by at least one heteroatom or heteroatom group of oxygen, sulfur or nitrogen, or

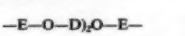
(5) substituted by at least one =O group and interrupted by at least one arylene, or

(6) interrupted by at least one heteroatom or heteroatom group of oxygen, sulfur or nitrogen, and interrupted by at least one arylene, or

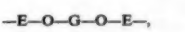
(7) substituted by at least one =O group and interrupted by at least one heteroatom or heteroatom group of oxygen, sulfur or nitrogen and interrupted by at least one arylene, or

A_3 represents $—B_3—Y_1—B_4$, wherein B_3 and B_4 represent arylene and Y_1 represents linear or branched alkylene, or linear or branched alkylene substituted by at least one —OH or =O group, or Y_1 represents a heteroatom selected from oxygen, sulfur or nitrogen, or

A_3 represents

 (a)

or

 (b)

wherein

z is a number ranging from 2 to 600,

E represents alkylene having 1–4 carbon atoms or $—CH_2—CHOH—CH_2—$,

D represents a bivalent hydrocarbon group containing 1–5 carbon atoms, and

G represents alkylene, cycloalkylene, arylene or aralkylene, or

when X is other than $—CO—X_2—CO—$, A_3 represents linear or branched alkylene or hydroxyalkylene, alkenylene or hydroxyalkenylene, cycloalkylene, or cycloalkenylene, containing up to 20 carbon atoms;

and $Z^{\ominus}$ represents a halide anion;

with the proviso that when X represents $—NH—CO—NH—$, A_3 represents $—E—O—D)_2O—E—$ or $—B_1—Y—B_2$, wherein Y has the meaning given for X above except for the value $—NH—CO—NH—$, or A_3

represents —E—O—G—O—E— wherein E and G have the meanings given above with the proviso that E and G are not simultaneously alkylene;

and an effective amount of at least one of a cationic, nonionic, anionic or amphoteric detergent, or a mixture thereof.

4,702,907

PROCESS FOR INDUCING SELECTIVE IMMUNOSUPPRESSION OF ANTIBODIES

Carl G. Becker, Manhasset; Tova Francus, and Gregory W. Siskind, both of New York, all of N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Aug. 9, 1983, Ser. No. 521,765

Int. Cl.[4] A61K *39/00, 39/12, 39/02, 39/36*

U.S. Cl. 424—88 **10 Claims**

1. A process for the selective immunosuppression of an antibody, which antibody is not of the IgE isotype which comprises:

(1) coupling a rutin like polyphenol having at least two hydroxyl groups to an antigen which antigen induces the formation of antibodies involved in a disuse or allergic condition to thereby form a resulting product, provided that if only two hydroxyl groups are present in said polyphenol, the hydroxyl groups are in an ortho position to one another and,

(2) injecting a sufficient amount of said resulting product intradermally into a subject,

whereby production of said antibody complimentary to said antigen is selectively suppressed

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4,702,908

COMPOSITION CONTAINING PLATELET FACTOR 4 AND METHOD FOR RESTORING SUPPRESSED IMMUNE RESPONSES

G. Jeanette Thorbecke, 3719 Regatta Pl., Douglaston, N.Y. 11363, and Marjorie Zucker, 333 Central Park West, New York, N.Y. 10025

Filed Nov. 1, 1985, Ser. No. 794,105

Int. Cl.[4] A61K *35/14*

U.S. Cl. 424—88 **28 Claims**

1. A parenteral dosage form for modulating immune response in a human comprising an effective amount for modulating immune response of platelet factor 4, and a pharmaceutically acceptable carrier or diluent, wherein said effective amount ranges between about 500 and about 5000 micrograms.

4,702,909

NON-A, NON-B HEPATITIS ANTIGEN, ANTIGEN COMPOSITIONS, VACCINE AND DIAGNOSTIC REAGENT

Victor M. Villarejos, and Kirsten A. Visona, both of San Jore, Costa Rica, assignors to Louisiana State University A & M, Baton Rouge, La.

Continuation-in-part of Ser. No. 374,846, May 5, 1982, abandoned. This application Apr. 26, 1984, Ser. No. 604,061

Int. Cl.[4] A61K *39/12;* **G21N** *33/531;* **C12N** *7/00, 7/02*

U.S. Cl. 424—89 **15 Claims**

1. A substantially purified non-A, non-B hepatitis antigen ATCC 40322, consisting essentially of particles having a size from about 2.0 to about 5.0 nm, and a density of from about 1.24 to about 1.30 g/cc in CsCl.

4,702,910

COMMON ANTIGEN (PSC-A) TO *PSEUDOMONAS AERUGINOSA* WHICH ACTS AS AN AGENT FOR PRETECTING *PSEUDOMONAS AERUGINOSA* INFECTION

Tamotsu Fukuda, Chiba; Shiro Shigeta, Fukushima; Hiroaki Okuya, Chiba; Yasuyuki Kuroiwa, Chiba, and Tadashi Sudo, Chiba, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 797,796

Int. Cl.[4] A61K *39/104;* **C07K** *15/04*

U.S. Cl. 424—92 **3 Claims**

1. PSC-A, a bacterial antigen obtained from *P. aeruginosa,* said antigen having the following properties:

a. amino acid composition:

Amino acid composition of PSC-A

Amino acid	mole %
Lysine	10.07
Histidine	0.06
Arginine	1.45
Aspartic acid or asparagine	5.63
Threonine	5.07
Serine	3.59
Glutamic acid or glutamine	15.44
Proline	2.17
Glycine	7.42
Alanine	20.27
Cystein	0.00
Valine	11.57
Methionine	1.45
Isoleucine	4.18
Leucine	7.10
Tyrosine	0.46
Phenylalanine	1.94
Tryptophan	2.12

b. a molecular weight as determined by SDS-polyacrylamide gel electrophoresis of about 15,000;

c. a lipid content of 7.0 to 10.0%;

d. a protein content of 55% as determined by colorimetric analysis by hydrolysis using ninhydrin;

e. a sugar content of 3.0 to 5.0%;

f. a hexosamine content of less than 1.0%;

g. an isoelectric point of pI=3.8–4.2 as determined by agarose electrofocusing;

h. stability in a neutral aqueous solution at room temperature for at least 24 hours;

i. maximum ultraviolet absorption at about 272 nm;

j. no decomposition of casein or collagen;

k. in appearance, a pale yellow powder soluble in water, physiological saline, and phosphate buffer, water soluble with a solubility of at least 1 mg/ml; and almost insoluble in methanol, ether, hexane, or chloroform;

l. producing a positive results in a Lowry-Folin reaction, ninhydrin reaction, phenol-sulfate reaction and anthron-sulfate reaction and a negative reaction in an Elson-Morgan reaction;

m. exhibiting no direct toxicity for either L cells of a cell line derived from mouse connective tissue before they are cultured for 24 hours or for leukocyte cells derived from the spleen of a normal mouse before they are cultured for 24 hours;

n. when said antigen is treated with pronase or heated at 100° C. for 10 minutes, there is not reaction with a serum from a mouse immunized with nontreated antigen;

o. an antibody which can react with *P. aeruginosa* appears in the serum of a mouse immunized with said antigen;

p. wherein the mouse monoclonal antibody having a specific affinity for PSC-A does not react with either the well-known common antigen OEP to *P. aeruginosa* or the endotoxin of *P. aeruginosa* (lipopolysaccharide).

4,702,911

PREPARATION OF BACTERIUM PILI SUBUNITS AND VACCINES CONTAINING PILI SUBUNITS

John C. McMichael, Tampa, Fla., assignor to ImmunoMed Corporation, Tampa, Fla.

Continuation of Ser. No. 781,065, Sep. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 571,347, Jan. 16, 1984, abandoned. This application Aug. 14, 1986, Ser. No. 895,588

Int. Cl.[4] A61K *39/108, 39/02, 39/116;* C07K *3/28*

U.S. Cl. 424—92 22 Claims

1. A method for obtaining bacterium pili subunits suitable for use in preparing a vaccine, said method comprising the steps of:

a. harvesting the bacteria from their growth medium in a buffer solution of substantially neutral pH;

b. adjusting the pH of the bacterial solution to about pH 9–11;

c. agitating the pH 9–11 bacterial solution to disrupt the pili;

d. centrifuging the pili-containing solution;

e. discarding the pellet formed during centrifugation step d;

f. adjusting the pH of the pili-containing supernatant retained from step e to above about pH 11.25 to obtain a pili subunit-containing solution;

g. adjusting the pH of the subunit-containing solution to substantial neutrality; and

h. adjusting the concentration of the pili subunit-containing material from step g to obtain the pili subunits suitable for use in preparing a vaccine.

4,702,912

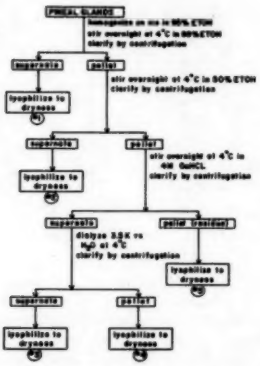
BIOACTIVE COMPOSITIONS AFFECTING HUMAN SKIN TISSUE

Alan G. Walton, 17 Walnut La., Weston, Conn. 06883

Filed Apr. 13, 1984, Ser. No. 599,881

Int. Cl.[4] A61K *7/42, 35/12*

U.S. Cl. 424—95 18 Claims



1. A method for the preparation of bioactive compositions comprising the extraction steps performed at a cold temperature of:

(a) homogenizing bovine; pineal glands in 95% ethanol, stirring said homogenate for a period of time to essentially complete the extraction, centrifuging said material, separating said resultant supernate and lyophilizing same to dryness (Fraction No. 1);

(b) stirring said centrifugate of step (a) in 50% ethanol for a period of time to essentially complete the extraction, centrifuging, separating said resultant supernate and lyophilizing same to dryness (Fraction No. 2);

(c) stirring said centrifugate of step (b) in 4M guanidine hydrochloride for a period of time to essentially complete the extraction, centrifuging, separating said resultant centrifugate and lyophilizing same to dryness (Fraction No. 5);

(d) dialyzing said supernate of step (c) against water, centrifuging, separating said resultant supernate, and lyophilizing same to dryness (Fraction No. 3);

(e) lyophilizing the centrifugate of step (d) to dryness (Fraction No. 4).

4,702,913

NOVEL COSMETIC COMPOSITIONS

Jean-Pierre Marty, Montesson, France, assignor to Roussel Uclaf, Paris, France

Continuation-in-part of Ser. No. 686,244, Dec. 26, 1984, abandoned. This application Feb. 10, 1987, Ser. No. 13,004

Claims priority, application France, Dec. 28, 1983, 83 20926

Int. Cl.[4] A61K *35/12*

U.S. Cl. 424—95 16 Claims

1. A skin cosmetic composition for moisturizing skin comprising a cosmetic or dermatological composition containing an amount of a mixture of oenothera oil and spleen tissue extract sufficient to moisturize skin.

4,702,914

VETERINARY-SAUCE PROPHYLACTIC

Hillary A. Ryan, Box 934, Far Hills, N.J. 07931

Filed Apr. 30, 1984, Ser. No. 605,194

Int. Cl.[4] A61K *35/78, 31/70, 31/495;* A23K *1/00*

U.S. Cl. 424—195.1 12 Claims

1. A veterinary food sauce comprising in combination: a ketchup sauce; and a minor amount of a veterinary prophylactic composition, relative to amount of said ketchup sauce.

4,702,915

SKIN REGENERATING COSMETIC COMPOSITION

Tibor Kéri, and Jánosné Kristóf, both of Debrecen, Hungary, assignors to Innofinance Altalanos Innovacios Penzintezet, Budapest, Hungary

PCT No. PCT/HU85/00065, § 371 Date Jul. 1, 1986, § 102(e) Date Jul. 1, 1986, PCT Pub. No. WO86/02833, PCT Pub. Date May 22, 1986

PCT Filed May 29, 1985, Ser. No. 890,777

Claims priority, application Hungary, Nov. 12, 1984, 4194/84; Oct. 9, 1985, 4194/84

Int. Cl.[4] A61K *35/78*

U.S. Cl. 424—195.1 9 Claims

1. A process for the preparation of a skin-regenerating cosmetic composition which comprises the steps of:

(a) crushing green pea grain or green pea pod;

(b) extracting the crushed green pea grain or green pea pod with water or with a mixture of water and ethanol to form an extract containing a cosmetically active ingredient;

(c) filtering the extract obtained during step (b) to provide a solution containing the cosmetically active ingredient; and

(d) combining the solution containing the cosmetically active ingredient with a cosmetically acceptable vehicle or diluent.

4,702,916

ANALGESIC STICK COMPOSITIONS

Navin Geria, Warren, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 3, 1985, Ser. No. 804,211

Int. Cl.[4] A61K *9/00, 9/06*

U.S. Cl. 424—400 8 Claims

1. An analgesic stick composition comprising

(i) a delivery system comprising about 10 to about 65% by weight alcohol; about 6 to about 10% by weight of an alkali metal salt of a saturated fatty acid gelling agent having from about C_8 to about C_{22}; about 10 to about 30% water; and

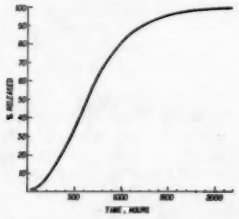
(ii) an analgesic compound selected from the group consisting of oleoresin capsicum, capsicum, camphor, capsaicin, allyl isothiocyanate, methyl nicotinate, menthol and mixtures thereof.

4,702,917

POROUS BIOABSORBABLE POLYESTERS

Anton Schindler, Durham, N.C., assignor to Research Triangle Institute, Research Triangle Park, N.C.

Filed Nov. 18, 1985, Ser. No. 798,883
Int. Cl.[4] A61K *9/00*; A61L *25/00*
U.S. Cl. 424—422 19 Claims



1. A article suitable for use as a controlled release reservoir for high molecular weight drugs, comprising a porous polymer formed by

(a) shaping a polylactone in the presence of a polyether comprised of polyoxypropylene and polyoxyethylene; and

(b) selectively eluting said polyether with an aqueous solution of an organic solvent from said shaped polylactone at a temperature of about 40° C. to 55° C. to form interconnected pores therein, the resulting pore volume exceeding the amount of material eluted, the resulting product defining a sealed interior reservoir in communication with said pores, which reservoir is suitable to receive said drugs.

4,702,918

PHARMACEUTICAL PREPARATIONS AND A METHOD OF MANUFACTURING THEM

Koichi Ushimaru, Kyoto; Koichi Nakamichi, Shiga, and Hitoshi Saito, Kyoto, all of Japan, assignors to Nippon Shinyaku Co. Ltd., Japan

Filed Aug. 2, 1985, Ser. No. 762,057
Claims priority, application Japan, Aug. 3, 1984, 59-163934
Int. Cl.[4] A61K *9/22*, *31/715*, *31/20*
U.S. Cl. 424—461 4 Claims

1. A sustained-release composition in capsule form having a specific gravity of not more than about 1, said capsules containing a mixture of (a) from about 10 to about 90% by weight of a cellulose derivative or a starch derivative which forms a gel in water and (b) from about 90 to 10% by weight of a higher fatty acid glyceride or higher alcohol or a mixture thereof which is solid at room temperature, both based on the weight of (a) and (b), and (c) from 0.01 to about 85% by weight based on the weight of (a), (b) and (c) of a pharmaceutical, said capsules having been prepared by filling capsules with said mixture of (a), (b) and (c), heating said capsules to a temperature above the melting point of (b) and cooling and solidifying said mixture.

4,702,919

GRANULES OF THIAMINE SALT AND THE PRODUCTION THEREOF

Nobuyuki Kitamori; Masaya Maeno, both of Suita, and Seiji Izuhara, Tondabayashi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Oct. 8, 1985, Ser. No. 785,391
Claims priority, application Japan, Oct. 9, 1984, 59-212345
Int. Cl.[4] A61K *9/36*, *9/16*, *31/51*
U.S. Cl. 424—480 10 Claims

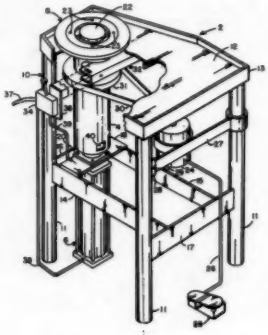
1. Thiamine salt granules consisting essentially of a thiamine salt and a binder, said thiamine salt accounting for about 95 to about 98 percent by weight of said granules on a dry basis, said granules having a grain size such that the portion of grains which do not pass through a 32-mesh sieve accounts for not more than 5 percent by weight and the portion of grains which pass through a 145-mesh sieve accounts for not more than 30 percent by weight, which granules are produced by spray-coating thiamine salt powder at least about 95 percent by weight of which is capable of passing through a 145-mesh sieve, with a solution containing a binder in an amount corresponding to about 2 to about 5 percent by weight based on the weight of said granules while maintaining said thiamine salt powder in a fluidized state in a fluidized-bed granulation apparatus.

4,702,920

POTTER'S WHEEL WITH ROTATING EXTRUDER

William Goodman, 213 E. 43rd St., Hibbing, Minn. 55746

Filed Nov. 17, 1986, Ser. No. 931,525
Int. Cl.[4] B28B *1/02*
U.S. Cl. 425—459 20 Claims



1. A potter's table comprising:

(a) a multi-legged table having an upper working surface;

(b) a flat disk-like wheel extending above said working surface and rotatably mounted to said table;

(c) means for rotating said wheel at a working speed;

(d) means coupled to said wheel for storing a supply of clay; and

(e) means for extruding clay from said storage means through the upper surface of said wheel for access by a potter.

4,702,921

METHOD FOR PREPARING FISH-EGG-LIKE EDIBLE PRODUCTS

Tsunesuke Ueda, Hino, Japan, assignor to Q.P. Corporation, Japan

Filed Jan. 31, 1986, Ser. No. 824,424
Int. Cl.[4] A23D *5/00*; A23L *1/04*
U.S. Cl. 426—48 19 Claims

1. A method for preparing fish-egg-like edible products

comprising capsules consisting of membranes of calcium alginate containing separate aqueous and oil phases in each said capsule comprising

a. preparing a viscous emulsion comprising a viscous fluid consisting of a viscosity imparting agent and water, a calcium salt, and an oil material,

b. forming capsules by dropping droplets of said emulsion into an alginate water solution and thereby surrounding said emulsion droplets with membranes of calcium alginate, and

c. separating said emulsion in said capsules into an aqueous phase consisting of said viscous fluid and an oil phase consisting of said oil material by heating said capsules to at least 45° C. for a time sufficient to cause said separating.

4,702,922

FRUIT PRODUCTS CONTAINING LACTIC ACID AND PROCESS FOR THE LACTIC ACID FERMENTATION OF FRUIT PRODUCTS

Alfred Wiesenberger, Wiesbaden-Sonnenberg; Jens A. Schildmann, Partenheim; Erich Kolb, Nieder-Olm, and Hans-Mario Dechent, Saulheim, all of Fed. Rep. of Germany, assignors to Peter Eckes KG mbH, Nieder-Olm, Fed. Rep. of Germany

Filed Feb. 5, 1986, Ser. No. 826,515

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1985, 3503742

Int. Cl.⁴ A23L *1/212, 1/06*

U.S. Cl. 426—51 **17 Claims**

1. A process for the preparation of lactic acid fruit products comprising providing an initial product in the form of a fruit mash or fruit juice at a pH of less than 3.7, heat treating said initial product at a temperature and for a period of time sufficient to destroy wild microflora contained therein and subjecting said heat treated initial product to fermentation at a pH of less than 3.7 by lactic acid producing bacteria, said fermentation being carried out at a sufficient temperature and for a sufficient period of time to thereby produce a product containing at least 95% by weight of L(+) lactic acid as the fermentation product, wherein said bacteria are those whose lactic acid producing metabolic pathways are induced and which commence and continue L(+) lactic acid production at pH values below 3.7.

4,702,923

LYOPHILIZED KEFIR YOGHURT HEALTH FOOD

Sennosuke Tokumaru, 10-3, Tsujido Taiheidai 1, Fujisawa-shi, Kanagawa-ken; Michinori Kubo, Sakai, and Mari Nogami, Suita, all of Japan, assignors to Sennosuke Tokumaru, Kanagawa, Japan

Filed Oct. 2, 1986, Ser. No. 914,835

Claims priority, application Japan, Oct. 8, 1985, 60-223987; Feb. 12, 1986, 61-26671

Int. Cl.⁴ A23C *9/12;* **A23L** *1/29*

U.S. Cl. 426—61 **5 Claims**

1. A health food which comprises 30 to 50% by weight lyophilized kefir yoghurt, 7 to 15% by weight at least one ingredient selected from the group consisting of an extract of *Acanthopanax senticosus Harms.*, an extract of *Cichorium Intylous L.* and a powder of reindeer antlers, and 40 to 55% by weight of at least one excipient.

4,702,924

DRIED MEAT CONTAINING COATING

Thomas M. Owens, Cahokia, Ill.; Thomas J. Wagner, Hillsboro, and William C. Mrazek, Jr., Mehlville, both of Mo., assignors to Ralston Purina Company, St. Louis, Mo.

Filed Jun. 9, 1983, Ser. No. 502,865

Int. Cl.⁴ A23K *1/08, 1/10*

U.S. Cl. 426—92 **16 Claims**

1. An animal food product of improved palatability comprising: a nutritionally balanced mixture of proteinaceous and farinaceous ingredients with a dusting, at a level effective to improve palatability of the product, of a dried palatability enhancing material comprising meat in an amount of about 25 to 41% by weight of said material, a vegetable protein isolate in an amount of about 6 to 23% by weight of said material, and whey in an amount of about 50 to 88% by weight of said material.

4,702,925

METHOD AND APPARATUS FOR SPRAYING SNOW-LIKE FROSTING ONTO FOOD STUFF PARTICLES

Marsha K. Verrico, Fair Lawn, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Filed Mar. 11, 1985, Ser. No. 710,400

Int. Cl.⁴ A23L *1/164*

U.S. Cl. 426—96 **8 Claims**

1. A method, comprising:

preparing a sweetener solution;

spraying said sweetener solution onto cereal particles by a means for atomizing and spraying for a sufficient time to form a frosted coating;

drying said frosted cereal particles by a means for drying, said means for drying utilizes room temperature air.

4,702,926

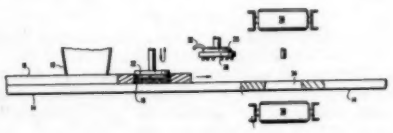
PROCESS FOR PRODUCING TWO-COMPONENT DOUGH PRODUCTS

David P. Fowler, Irving, Tex., assignor to Frito-Lay, Inc., Dallas, Tex.

Filed May 10, 1982, Ser. No. 376,729

Int. Cl.⁴ A21D *8/02;* **A23P** *1/00*

U.S. Cl. 426—283 **13 Claims**



1. A process for producing a multicomponent dough product, wherein dough is a first component, comprising:

(a) depositing a measured quantity of dough in a product forming mold cavity to fill said cavity with dough;

(b) embossing said dough in said mold to form an impressed pattern within said dough;

(c) filling said impressed pattern by applying to the impressed pattern a measured quantity of an edible second component in the shape of said pattern, to form a dough product;

(d) removing said dough product.

4,702,927

METHOD FOR DRYING WATER RETENTIVE SUBSTANCE

Motohiko Hirotsuka; Tetsuro Harada, both of Izumisano; Nobuhiro Ohtsubo, Sennan; Hiroyuki Kawade, Izumi; Yoshiyuki Hayakawa, and Hitoshi Taniguchi, both of Sennan, all of Japan, assignors to Fuji Oil Company, Ltd. and Hosokawa Micron Corporation, both of Osaka, Japan

Filed Feb. 3, 1986, Ser. No. 825,266

Int. Cl.⁴ A23B *7/02*

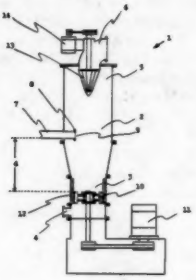
U.S. Cl. 426—467 **10 Claims**

1. A method for drying a water retentive substance which comprises the steps of

adjusting the shape of a water retentive substance having a water content of 95 to 55% by weight to particles having a particle size of 1.5 to 13 mm;

feeding the particles of the substance to a pneumatic conveying drying apparatus comprising a pneumatic conveying dryer section, a pulverizer section provided at the lower

part of the dryer section, a hot gas inlet provided below the pulverizer, a classifier section provided at the upper part of the dryer section and an exhaust vent connected to the upper end of the classifier, said feeding being at a site at least 500 mm above the pulverizer section permitting the substance to fall to the pulverizer section under the influence of gravity;



pulverizing the particles of the substance with the pulverizer;

passing the pulverized substance through the dryer section by means of a hot gas flow from the hot gas inlet to dry the substance;

classifying the pulverized substance by passing through the classifier; and

venting the pulverized substance through the exhaust vent.

4,702,928

PROCESS FOR PRODUCING FAT BLENDS FOR MARGARINE AND LOW-FAT SPREADS

Theophil Wieske; Klaus H. Todt, both of Hamburg, Fed. Rep. of Germany, and Johan F. Kleibeuker, Leeuwarden, Netherlands, assignors to Internationale Octrooi Maatschappij "Octropa" B.V., Rotterdam, Netherlands

Filed Dec. 18, 1985, Ser. No. 811,080

Claims priority, application United Kingdom, Dec. 19, 1984, 84 32058

Int. Cl.[4] A23D *5/02*

U.S. Cl. 426—607 **15 Claims**

1. A process for producing a fat blend, comprising mixing appropriate proportions of

a fat (a) comprising SE_2 and S_2E triglycerides,

a fat (b) comprising S_2U triglycerides more than 60% of which consist of SUS triglycerides,

a fat (c) comprising S_2U triglycerides more than 60% of which consist of SSU trigylcerides, and

a fat (d) having a melting point below 28° C., so as to obtain a fat blend wherein:

the level of S_3 triglycerides does not exceed 3%;

the sum of the levels of S_3 and S_2E triglycerides ranges from 1 to 10%;

the level of S_2U triglycerides ranges from 12 to 35%;

the level of S_2M triglycerides ranges from 0 to 10%;

the sum of the levels of S_3, S_2E, SE_2, S_2U and S_2M triglycerides ranges from 25 to 60%;

the ratio of SUS to SSU triglycerides ranges from 0.6 to 2.0; and wherein

S is saturated fatty acid having a chain length of 16 or more carbon atoms,

E is an unsaturated fatty acid in the transconfiguration with a chin length of 16 or more carbon atoms,

U is mono- or polyunsaturated fatty acid in the cis-configuration with a chain length of 18 or more carbon atoms, and

M is a saturated fatty acid with 12 or 14 carbon atoms,

SUS being a symmetrical triglyceride, and

SSU being an asymmetrical triglyceride,

the remainder of the triglycerides consisting of triglycerides which are liquid at 10° C., and do not substantially contribute to the structure of the blend.

4,702,929

METHOD FOR THE MANUFACTURING OF MUNCHIES

Carsten J. Lehn, Ejlskovvej 75, Sonderso, Denmark (5471), and John Poyser, Vestergade 2, Bogense, Denmark (5400)

Filed Aug. 13, 1985, Ser. No. 765,314

Claims priority, application Denmark, Aug. 30, 1984, 4141/84

Int. Cl.[4] A23K *1/10*

U.S. Cl. 426—635 **13 Claims**

1. A method of manufacturing snacks for pets, said method consisting essentially of the steps of:

(a) providing tannery wastes produced from liming and including sulfur and lime therein;

(b) dehydrating the tannery wastes to form a dehydrated product;

(c) chopping the dehydrated product;

(d) mixing the chopped dehydrated material with a starch material to form a starch-containing mixture;

(e) extruding the starch-containing mixture at an elevated temperature using an extruder with a worm mounted on a die plate with holes about 6¼ millimeters in diameter and with five heating zones, and wherein the material is heated intensely in the second and fourth zones and is cooled in the fifth zone; and

(f) cooling the extruded mixture.

4,702,930

METHOD OF PRODUCING IMPLANTABLE BONE REPLACEMENT MATERIALS

Helmut Heide, Kelkheim; Heinz-Werner Etzkorn, Neu-Anspach; Eva Poeschel, Bad Soden, and Helmut Steininger, Neu-Anspach, all of Fed. Rep. of Germany, assignors to Battelle-Institute e.V., Frankfurt/Main, Fed. Rep. of Germany

PCT No. PCT/EP85/00586, § 371 Date Jul. 18, 1986, § 102(e) Date Jul. 18, 1986, PCT Pub. No. WO86/03977, PCT Pub. Date Jul. 17, 1986

PCT Filed Nov. 4, 1985, Ser. No. 890,854

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447583

Int. Cl.[4] A01N *1/02*; B05D *3/06*

U.S. Cl. 427—2 **20 Claims**

1. Method of producing implantable bone replacement materials by coating a metallic core with a bioactive material, comprising: applying a porous layer of hydroxyl apatite onto the metallic core and compacting it by hot isostatic pressing, the pressure and the temperature being adjusted such that dehydration of hydroxyl apatite is prevented; and subsequently partially dehydrating the hydroxyl apatite by ion bombardment.

4,702,931

PAINT SPRAY MACHINE HAVING WET FILM THICKNESS MEASUREMENT AND FEEDBACK CONTROL

Allan F. Falcoff, Lake Orion, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 31, 1986, Ser. No. 925,383

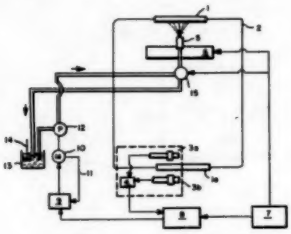
Int. Cl.[4] B05C *11/00*; A01G *27/00*; B67D *5/08*

U.S. Cl. 427—10 **6 Claims**

6. An improved paint spraying method for applying coats of paint to an object using a spray machine with a paint spray gun having an adjustable spray nozzle, a gear pump tubularly connected to the spray gun that pumps paint to the spray gun, a vessel containing paint tubularly connected to the spray gun, a variable speed electric motor that drives the gear pump, a pump motor controller that controls the electric motor of the gear pump, means for moving the spray gun vertically and horizontally and for controlling the speed and acceleration of the movement of the gun, means for controlling the number of passes made by the gun, means for controlling the dwell period

at the end of each pass and means for controlling the flash time between coats of paint applied by the gun; wherein the improvement used therewith comprises

a. measuring the wet paint film thickness with a wet film measuring device of the paint applied to the surface of the object without contacting the object at a multiplicity of predetermined points over the entire painted surface of the object and generating an electrical signal by the device for each film thickness measurement wherein the signal is proportional to the film thickness and correlating the



measurement to point at which the measurement was made;

b. calculating the increase or decrease through a computer that received the signal from the measuring device of the amount of paint to be applied to the next object being sprayed at each point the film thickness was measured and converting via the computer to a signal and feeding the signal to the pump motor controller which controls the motor driving the gear pump feeding paint to the spray gun whereby the spray gun applies a uniformly thick paint film to the object.

4,702,932

ELECTROSTATIC APPLICATION OF COATING MATERIALS

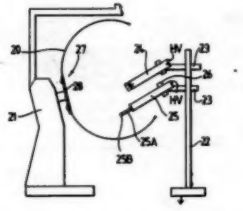
Roberto F. Cosentino, and Franco B. Bonapace, both of Milan, Italy, assignors to Pharmindev Ltd., London, England

Continuation of Ser. No. 689,933, Jan. 9, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 20,212

Claims priority, application United Kingdom, Jan. 10, 1984, 8400562

Int. Cl.[4] B05D *1/04*

U.S. Cl. 427—33 **14 Claims**



1. A method for the electrostatic application of a substantially non-electrically conductive coating material to a substantially non-electrically conductive particulate product such as pellets, seeds and powdered materials, to be coated, comprising imparting turbulent motion to the product, directing at least one electrostatic coating material spraying device toward the product while the latter is in turbulent motion and applying to the or each spraying device a high potential diffrence whereby the coating material is electrostatically charged and an electrostatic charge of opposite polarity is induced on the product, without using separate charging electrodes or earth connections, to cause electrostatic attraction between the coating material and the product.

5. Apparatus for the electrostatic application of a substantially non-electrically conductive coating material to a substantially non-electrically conductive particulate product such as pellets, seeds and powdered materials, to be coated, comprising at least one electrostatic coating material spraying device, and handling means for imparting turbulent motion to the product to be coated, the spraying device being mounted to direct a spray of the coating material onto the moving product and adapted for connection to a high voltage source, whereby in use, an electrostatic charge is applied to the coating material and an electrostatic charge of opposite polarity is included on the product without the use of separate charging electrodes or earth connections to cause electrostatic attraction between the coating material and the product.

4,702,933

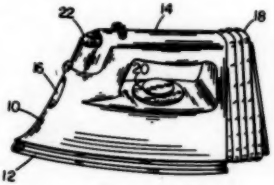
FABRIC PRESSING DEVICE

Carolyn M. Kramer, Cambridge, Mass., assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Division of Ser. No. 759,406, Jul. 26, 1985, Pat. No. 4,665,637. This application Apr. 7, 1986, Ser. No. 849,043

Int. Cl.[4] B05D *1/10*

U.S. Cl. 427—34 **8 Claims**



1. A method of manufacturing a fabric pressing device comprising the steps of providing a base component of thermally conductive material that is adapted to be coupled to the heat source of the pressing device and that has a rough surface,

adhering a layer of ceramic material to said rough surface of said base component by heating ceramic particles, spraying said heated particles onto said rough surface of said base component to form a ceramic layer that has a thickness of at least about fifty micrometers, and that is composed of ceramic particles that are bonded together, and

smoothing the surface of said adhered layer of ceramic material to provide a planar fabric pressing surface.

4,702,934

ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER, PROCESS AND APPARATUS FOR THE PREPARATION THEREOF

Shunichi Ishihara, Ebina; Keishi Saito, Nabari; Shunri Oda, Tokyo, and Isamu Shimizu, Yokohama, all of Japan, assignors to Canon kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,277

Claims priority, application Japan, Mar. 28, 1985, 60-064248

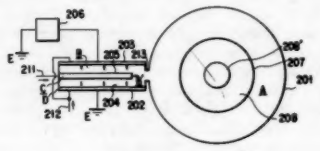
Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—39 **18 Claims**

1. A process for preparing an electrophotographic photosensitive member which comprises introducing an active species into a film forming space through a transportation space for the active species and a precursor into the film forming space through a transportation space for the precursor and chemically and mutually reacting the active species and the precursor in the film forming space in the absence of a plasma to form a light accepting layer on a substrate for electrophotography being placed in the film forming space.

10. An apparatus for preparing an electrophotographic pho-

tosensitive member which comprises an active species generation chamber, an active species transportation passage being situated at the downstream-side of the active species generation chamber, a precursor generation chamber, a precursor transportation passage being situated separately from and



within the active species transportation passage, a microwave power source being electrically connected to the active species generation chamber and the precursor generation chamber, and a film formation chamber having a substrate supporting means.

4,702,935

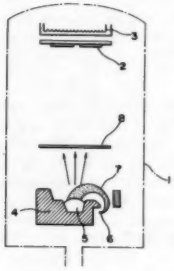
PRODUCTION METHOD OF A HIGH MAGNETIC PERMEABILITY ALLOY FILM

Masaru Kadono; Kumio Nago; Tatsushi Yamamoto; Tersuro Muramatsu; Shuuhei Tsuchimoto; Mitsuhiko Yoshikawa, all of Nara, and Masatoshi Tomita, Hyogo, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 22, 1984, Ser. No. 663,128

Int. Cl.[4] B05D *3/06;* **C23C** *16/06*

U.S. Cl. 427—42 **13 Claims**



1. A production method for producing a high permeability alloy film, comprising:

evaporating into a vapor a sendust alloy material containing 1–6 wt % Al, 20–35 wt % Si and the remainder being iron by irradiating said alloy with an electron beam; and

depositing the vapor of the alloy material onto a substrate for a predetermined time to produce an alloy film composition having a high magnetic permeability suitable for use as a magnetic head material.

4,702,936

GAS-PHASE GROWTH PROCESS

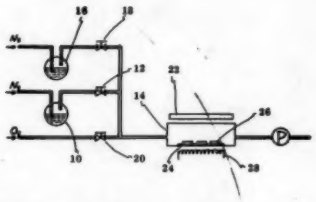
Kazuo Maeda; Noboru Tokumasu, and Toshihiko Fukuyama, all of Tokyo, Japan, assignors to Applied Materials Japan, Inc., Tokyo, Japan

Filed Sep. 20, 1985, Ser. No. 778,004

Claims priority, application Japan, Sep. 20, 1984, 59-197100; Sep. 25, 1984, 59-200244; Oct. 26, 1984, 59-226231; Oct. 26, 1984, 59-226232

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—54.1 **6 Claims**



1. A gas-phase growth process for forming a film of SiO_2, Si_3N_4 or $Si_xO_yN_z$, which comprises introducing a reaction mixture of an organic silane with a reaction gas selected from O_2, N_2O, NO_2, NO, CO_2, CO, NH_3 or a mixture thereof, into a reaction chamber kept at a reaction temperature below 500° C. and subjecting the surface of a substrate which is contained in said reaction chamber to UV irradiation to effect photo-excitation of said reaction mixture and to induce a surface reaction thereof, forming a film of SiO_2, Si_3N_4 or $Si_xO_yN_z$.

4,702,937

METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE

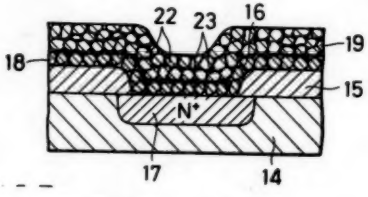
Hisayoshi Yamoto, and Hideo Suzuki, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 3, 1985, Ser. No. 804,092

Claims priority, application Japan, Dec. 4, 1984, 59-256274

Int. Cl.[4] H01L *21/285*

U.S. Cl. 437—233 **15 Claims**

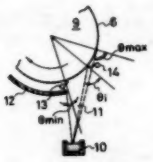


1. The method of manufacturing a semiconductor device incorporating a polycrystalline layer containing oxygen, comprising the steps of: forming a first polycrystalline silicon layer over at least an electrically connecting portion formed in a semiconductor substrate; forming a second polycrystalline silicon layer, containing oxygen, on said first polycrystalline silicon layer and thereby forming a layer of silicon dioxide between the first and second layers; and annealing said semiconductor substrate on which said first and second polycrystalline silicon layers are formed thereby converting the silicon dioxide layer into discontinuous SiO_2 masses and substantially ohmically connecting said first and second layers.

4,702,938
PROCESS FOR PRODUCING MAGNETIC RECORDING MATERIAL

Tadashi Yasunaga; Akio Yanai, and Ryuji Shirahata, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 21, 1986, Ser. No. 933,446
Claims priority, application Japan, Nov. 21, 1985, 60-262223
Int. Cl.[4] H01F *10/02*
U.S. Cl. 427—132 **4 Claims**



1. A process for producing a magnetic recording medium, comprising the steps of:

evaporating a magnetic metallic material from an evaporation source into an evporation stream;

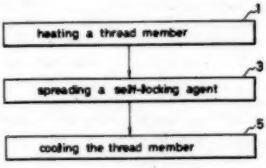
moving a substrate onto which said evaporating magnetic material is deposited through said evaporation stream such that an angle of incidence of said evaporation stream on said substrate varies from a maximum value (θ_{max}) to a minimum value (θ_{min}); and

supplying an oxidizing gas both to a vicinity of said substrate near said minimum angle of incidence and to a vicinity having an intermediate angle of incidence (θ_i) between said minimum and maximum angles of incidence.

4,702,939
SELF-LOCKING AGENT AND SELF-LOCKING SCREW MATERIAL

Yukio Miyauchi; Yuichi Nakagawa; Makoto Kurihara, and Norifumi Hayashi, all of Hachioji, Japan, assignors to Three Bond Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,394
Claims priority, application Japan, Jan. 17, 1985, 60-5005
Int. Cl.[4] B05D *3/02;* **B32B** *9/04, 15/08;* **F16B** *39/02*
U.S. Cl. 427—195 **14 Claims**



1. A self-locking agent consisting essentially of a mixture of:

(a) 100 parts by weight of a first material adhered to a screw surface to carry out a function of self-locking,

said first material being selected from the group consisting of a polyamide and a copolyamide; and

(b) a sufficient amount of a second material to have an adhesive ability in advance of fastening the screw to carry out a function of causing the first material to adhere to the screw surface, the amount of the first material being greater than that of the second material, said second material consisting essentially of a first adhesive agent comprising epoxy resin and a second adhesive agent selected from the group consisting of a phenol resin, isocyanate compound, titanate, silane coupling agent and an organic-silicon compound having an amino or oxirane base.

3. The self-locking agent according to claim **1**, wherein said first material is nylon.

10. The self-locking agent according to claim **3** further comprising an amount of volatile solvent, wherein said first material and second material are dissolved in the volatile solvent.

12. A method of producing a self-locking screw material by making use of the self-locking agent of claim **10**, comprising the following steps:

(a) drying said self-locking agent to produce a solid self-locking agent;

(b) crushing the solid self-locking agent to form a powdered self-locking agent composed of fine particles coated with said second material;

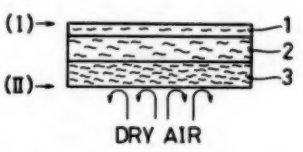
(c) heating a screw material to such a high temperature that the self-locking agent can be welded; and

(d) spreading said powdered self-locking agent on said heated screw material.

4,702,940
METHOD OF PRODUCING FILTER FOR AIR CLEANER

Toshiaki Nakayama, Kariya; Tokio Kohama, Nishio; Isamu Okada, and Tamio Yokoyama, both of Kurita, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Kureha Ltd., Osaka, both of, Japan

Filed Apr. 30, 1986, Ser. No. 857,250
Claims priority, application Japan, May 1, 1985, 60-94767
Int. Cl.[4] B05D *3/02, 5/00;* **B01D** *50/00*
U.S. Cl. 427—244 **10 Claims**



1. A method for producing a filter for an air cleaner which comprises the steps of

impregnating a sheetlike web of fibers, which has two opposite sides separated by a body of the web having a thickness direction extending between said sides, with a solution, suspension, or emulsion containing a binder dissolved or suspended in a solvent or dispersing agent and,

differentially drying the impregnated fiber web with respect to said two opposite sides thereof such that said solvent or dispersing agent evaporates from one of said sides faster than from the other of said sides for moving the solution, suspension, or emulsion along the thickness direction of said web from nearer one said side towards the other said side and thereby progressively depositing more binder in said body towards said one side than towards said other side joining said fibers with said binder and causing said filter to have a density gradient in which density decreases progressively across the thickness of said body from said one side to said other side.

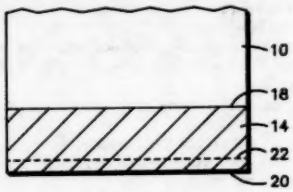
4,702,941
GOLD METALLIZATION PROCESS

Curtis W. Mitchell, Scottsdale, and Barry C. Johnson, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Mar. 27, 1984, Ser. No. 593,949
Int. Cl.[4] C23C *16/06*
U.S. Cl. 427—250 **12 Claims**

1. A one step method for applying a layer of metal comprising gold to a silicon substrate surface which comprises the steps of: cleaning said surface; heating said substrate to a first temperature of between about 200° C. and about 360° C. in a reduced pressure ambient; evaporating said metal at a reduced

pressure onto said surface at said first temperature, allowing silicon to diffuse into but not through said metal; and cooling



said substrate to a second temperature lower than said first temperature to limit the continued diffusion of silicon into but not through said metal.

4,702,942

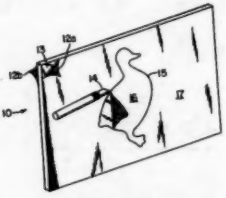
DECO-PLEX PROCESS

Timothy J. Wood, 340 Laurel St., East Haven, Conn. 06512

Continuation-in-part of Ser. No. 707,132, Mar. 1, 1985, abandoned. This application Mar. 3, 1986, Ser. No. 835,766

Int. Cl.[4] B05D *1/32*

U.S. Cl. 427—259 **4 Claims**



1. A process for preparing a work of art from a sheet of transparent plastic material having an existing protective paper adhering to and covering the front and rear sides thereof comprising the steps of:

forming the mirror image of a multi-colored design to be created on the exposed surface of the protective paper on the rear side of the sheet of transparent material;

tracing a least a first portion of the design formed on the protective paper adhering to the rear side of the sheet of transparent material with a cutting tool, the said first portion being a portion of the design which is to comprise a first color, the tracing defining a continuous severed outline of said at least first portion of the design;

removing the protective paper from within the severed outline to expose at least a first part of the rear side of the sheet of transparent material;

painting the said first exposed part of the rear side of the sheet of transparent material with a paint of said first color;

tracing at least a second portion of the design formed on the protective paper adhering to the rear side of the sheet of transparent material with a cutting tool, the said second portion being a portion of the design which is to comprise a second color, the tracing defining a continuous severed outline of said at least second portion of the design;

removing the protective paper from within the severed outline of said at least second portion of the design to expose at least a second part of the rear side of the sheet of transparent material;

painting at least the said second exposed part of the rear side of the sheet of transparent material with a paint of said second color, the second color paint being applied over the first color paint at least in the abutting areas of said first and second design portions;

repeating the steps of tracing, removing and painting as required until all the colored portions of the design have been created;

removing any remaining of the protective paper from the rear side of the sheet of transparent material; and

removing the protective paper adhering to the front side of the sheet of transparent material to permit viewing of the multi-color design through the transparent sheet.

4,702,943

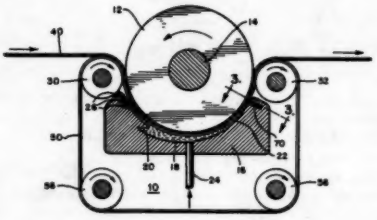
PATTERN FORMING SATURATOR AND METHOD

Eliot R. Long, Arlington Heights, Ill., assignor to Miply Equipment, Inc., South Bend, Ind.

Filed Jul. 9, 1986, Ser. No. 883,550

Int. Cl.[4] B05D *5/00, 1/18;* **B05C** *3/132, 3/20*

U.S. Cl. 427—282 **61 Claims**



1. In a saturator of the type comprising means for defining a chamber for containing a pressurized saturant therein and means for moving a web through the chamber to bring a first side of the web into contact with the pressurized saturant to cause the saturant to impregnate the web, the improvement comprising:

a stencil having at least one impermeable region shaped to cover less than the entire web; and

means for passing the stencil through the chamber at the same speed as the web with the stencil juxtaposed against the first side of the web such that portions of the web aligned with the at least one impermeable region are not impregnated with the saturant while other, exposed portions of the web are impregnated with the saturant.

45. A method for selectively applying a saturant to only a patterned portion of a web with a saturator of the type comprising means for defining a chamber for containing a pressurized saturant therein and means for moving the web through the chamber to bring a first side of the web into contact with the pressurized saturant to cause the saturant to impregnate the web, said method comprising the following steps

providing a stencil having at least one impermeable region shaped to cover less than the entire web; and

passing the stencil through the chamber at the same speed as the web with the stencil juxtaposed against the first side of the web such that the portions or the web aligned with the at least one impermeable region are not impregnated with the saturant and other, exposed portions of the web are impregnated with the saturant.

4,702,944

PROCESS FOR BINDING NON-WOVENS WITH ACRYLATE COMPOUNDS

Ronald J. Thompson, Sarnia, Canada, assignor to Polysar Limited, Sarnia, Canada

Division of Ser. No. 763,892, Aug. 9, 1985, Pat. No. 4,563,289, which is a continuation of Ser. No. 598,928, Apr. 10, 1984, abandoned. This application Nov. 21, 1985, Ser. No. 800,272

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—389.8 **3 Claims**

1. A method of saturating a non-woven web of natural or synthetic fibers comprising impregnating a web having a dry weight from 5 to 130 g/yd^2 with from about 30 to 50% by dry

weight, based on the dry weight of the web of a composition based on a polymer comprising

(i) from 50–99.5 weight % of a C_{1-8} alkyl or alkanol ester of acrylic or methacrylic acid or a mixture thereof;

(ii) from about 30 to 50 weight % of one or more monomers selected from the group consisting of C_{8-12} vinyl aromatic monomers, methyl methacrylate and C_{2-4} alkenyl nitriles;

(iii) from about 0.5 to 20 weight % of a C_{3-9} ethylenically unsaturated carboxylic acid or an anhydride of a C_{4-9} ethylenically unsaturated di-carboxylic acid;

the improvements comprising using a latex which has been neutralized to a pH from 6.5 to 8.5 using an alkali metal hydroxide selected from the group consisting of sodium hydroxide, potassium hydroxide or a mixture thereof; and said compound contains from about 0.25 to 3.0 parts by weight per 100 parts by weight of said polymer of a latent acid selected from the group consisting of p-toluene sulfonic acid, ammonium chloride, ammonium nitrate, ammonium sulfate, and chlorides, nitrates and sulfates of C_{1-4} alkyl and alkanol amines; and drying and curing the web in the absence of a polyvalent metal ion.

4,702,945

OPTICAL RECORDING MEDIUM

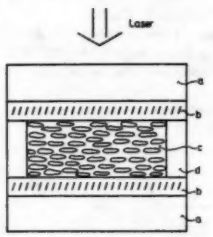
Karl-Heinz Etzbach, Frankenthal; Peter Neumann, Wiesloch; Matthias Dust, Mannheim; Helmut Ringsdorf, Mainz-Gonsenheim; Hans-Werner Schmidt, Mainz; Guenter Baur; Friedrich Windscheid, both of Freiburg, and Rudolf Kiefer, Voerstetten, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 9, 1985, Ser. No. 764,079

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429438

Int. Cl.⁴ C09K *19/00*

U.S. Cl. 428—1 **5 Claims**



1. An optical recording medium which possesses, on a base or between two supports, a layer comprising a polymer which forms liquid-crystalline phases and contains one or more dyes wherein the dye is chemically bonded, via a spacer, to the polymer.

4,702,946

COATED CYLINDRICAL MEMBER

Howard Howland, 88 Clinton Pl., Hackensack, N.J. 07601

Division of Ser. No. 745,888, Jun. 18, 1985, Pat. No. 4,642,248. This application Oct. 31, 1986, Ser. No. 925,390

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.⁴ B21B *31/08*

U.S. Cl. 428—36 **5 Claims**

1. A rotor-gravure printing cylinder comprising:

an inner member having a cylindrical outer surface; and

an epoxy coating of substantially uniform radial thickness bonded to the outer member surface and formed by a porous inner layer having an outer surface, and

a porous outer layer overlying the outer surface of the inner layer and in turn having a substantially nonporous and cylindrical outer surface.

4,702,947

FIBROUS STRUCTURE AND METHOD OF MANUFACTURE

David B. Pall, Roslyn Estates; Peter J. Degen, Huntington; Thomas C. Gsell, Glen Cove, and Eleni C. Yanakis, Ridge, all of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Filed Apr. 1, 1986, Ser. No. 846,803

Int. Cl.⁴ B32B *27/00*

U.S. Cl. 428—36 **23 Claims**

15. A three-dimensional, polymeric, microfibrous structure with structural rigidity comprising normally hydrophobic microfibers coated with a cured, precipitated, cationic, thermoset binder resin or polymer, said structure characterized by being hydrophilic and having a positive zeta potential and enhanced capability for the removal of negatively-charged particulate material in a fluid medium.

4,702,948

SELF-ADHESIVE TAPE WITH TWO-SIDED CONTACT ADHESIVE COATING AND METHOD OF PRODUCING THE SAME

Paul Sieber-Gadient, Felsbergstrasse 6, 6006 Luzern, Switzerland

Continuation of Ser. No. 531,241, Sep. 12, 1983, abandoned. This application Dec. 5, 1985, Ser. No. 804,824

Int. Cl.⁴ B05D *3/06*

U.S. Cl. 428—40 **7 Claims**

1. A double-sided bonding self-adhesive tape comprising:

a non-cleavable substantially stretch-resistant grid-like woven supporting fabric defining two sides;

said non-cleavable substantially stretch-resistant grid-like woven supporting fabric possessing throughpassing apertures;

contact adhesive means;

said contact adhesive means being arranged on both of said two sides of said non-cleavable substantially stretch-resistant grid-like woven supporting fabric;

said contact adhesive means arranged on one of said two sides of said non-cleavable substantially stretch-resistant grid-like woven supporting fabric defining a substantially continuous self-adhesive coating possessing an outer substantially planar adhesive surface;

said contact adhesive means arranged on the other one of said two sides of said non-cleavable substantially stretch-resistant grid-like woven supporting fabric defining a substantially continuous self-adhesive coating possessing an outer substantially non-planar structured adhesive surface which followa the structure of the non-cleavable substantially stretch-resistant grid-like woven supporting fabric;

said two adhesive surfaces of said contact adhesive means

being interconnected with one another through said throughpassing apertures of said woven supporting fabric;

one of the two sides of said double-sided bonding self-adhesive tape having a different surface structure and thus inherently possessing a different adhesive capability than the other one of the two sides of said double-sided bonding self-adhesive tape;

said one of said two sides of said double-sided bonding self-adhesive tape having said different surface structure and inherently possessing said different adhesive capability possessing a greater adhesive capability than said other one of said two sides and defining a top side of the double-sided bonding self-adhesive tape to enable said one side defining said top side to be securely attached to a structure intended to be releasably connected to a supporting surface by means of said double-sided bonding self-adhesive tape;

said other one of said two sides of said double-sided bonding self-adhesive tape possessing a lesser adhesive capability than said one side defining said top side of said double-sided bonding self-adhesive tape and being intended for releasable application to the supporting surface at which there is intended to be supported the structure carried by the top side of the double-sided bonding self-adhesive tape to enable said double-sided bonding self-adhesive tape together with the structure supported by the top side of the tape to be removed from the supporting surface; and

said two adhesive surfaces of said contact adhesive means being substantially aging-resistant and substantially resistant to softeners.

4,702,949

WOVEN TEXTILE FABRICS, NAMELY VELOURS, AND METHOD FOR ITS MANUFACTURE

Klaus Rohleder, Klausenhof 2, and Willi Stark, Wichernstrasse 21, both of D-8684 Konradsreuth, Fed. Rep. of Germany

Filed Sep. 17, 1986, Ser. No. 908,286

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538794

Int. Cl.[4] B32B *3/02, 33/00*

U.S. Cl. 428—92 **15 Claims**

1. A woven textile velours fabric comprising a foundation fabric and pile of synthetic fibers, at least the pile fibers being strongly crinkled in the untreated woven state, sections of the pile fibers projecting out of the foundation fabric characterized in that such projecting fiber sections are permanently uncrinkled, straightened and largely parallel in the nap surface area of said fabric in essentially straight disposition, while sections in the pile fibers in the area of the foundation fabric exhibit such strong crinkling.

4,702,950

BITUMEN BACKED CARPET TILE AND METHOD OF PRODUCTION

David K. Slosberg, Atlanta; David S. Reece, Rome, both of Ga., and Johannes A. H. Claessen, Leusden, Netherlands, assignors to Heuga Holding bv, Scherpenzeel, Netherlands

Filed Feb. 6, 1987, Ser. No. 11,624

Int. Cl.[4] B32B *3/02, 33/00*

U.S. Cl. 428—95 **29 Claims**

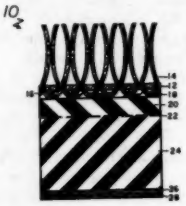
1. A carpet tile, which carpet tile comprises in combination:

(a) a fibrous face wear surface secured to a primary backing sheet, the primary backing sheet having a fibrous back surface;

(b) a first precoat layer on the primary backing surface and comprising a hot melt bitumen or petroleum resin composition to aid in securing the fibrous back surface to the primary backing sheet;

(c) a second precoat layer secured to the first coating layer and which second coating layer comprises a bitumen hot melt composition containing a sufficient amount of an adhesive polymer to permit lamination of the surface of the second coating layer to a third coating layer;

(d) a third coat backing layer which comprises a bitumen hot melt composition to provide for backing layer flexibility and adhesion to the second coating layer; and



(e) a secondary backing sheet material to provide dimensional stability to the carpet and secured to the third coating backing layer.

4,702,951

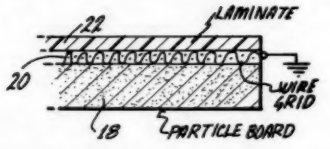
PRODUCT HAVING GROUNDED STATIC-FREE WORK SURFACE

Jack Rooklyn, Northridge, Calif., assignor to Industrial Management Co., Chatsworth, Calif.

Continuation-in-part of Ser. No. 286,611, Jul. 24, 1981, Pat. No. 4,456,944, which is a continuation-in-part of Ser. No. 180,962, Aug. 25, 1980, abandoned. This application May 22, 1984, Ser. No. 613,088

Int. Cl.[4] B32B *15/04, 23/02*

U.S. Cl. 428—193 **7 Claims**



1. As an article of manufacture, a product providing a conductive surface capable of dissipating static charges at a rate providing safety for sensitive components, comprising in combination a first member of relatively thick non-conductive material adapted for providing at least a part of a working surface, a second member in the form of a relatively thin flexible sheet of wire mesh material placed over the first member, the wire mesh member being secured to the edges of the first member, a third laminate member in the form of a plastic sheet of melamine, the said second member of wire mesh material being laminated under the third member of laminated plastic, the third member having a thickness whereby to enable static charges from components on the working surface to dissipate through the plastic surface to the wire mesh grid and to a grounding connection.

4,702,952
SHEET FORMING FABRIC WITH REINFORCED MARGINS

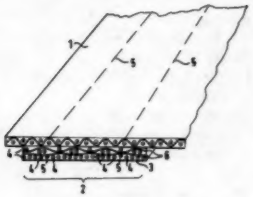
Georg Borel, Reutlingen, Fed. Rep. of Germany, assignor to Hermann Wagner GmbH & Co. KG, Reutlingen, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 819,552

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501980

Int. Cl.[4] D21F *1/10*; B32B *23/02*; D03D *15/00*

U.S. Cl. 428—193 **3 Claims**



1. A sheet forming fabric with reinforced margins comprising a forming fabric and at least one elongated fabric strip woven from thread secured to the non forming side of said forming fabric parallel to the edge of said forming fabric, said fabric strip having a double layer structure with transverse threads arranged at least partially in pairs one over the other and with longitudinal threads interwoven with said at least partially in pairs one over the other and with longitudinal threads interwoven with said transverse threads such that the contact surface of the strip exclusively consists of longitudinally oriented floatings of the longitudinal threads.

4,702,953
LAMINATES OF POLYHYDANTOINS

Friedrich Jonas, Aachen; Richard Müller; Rudolf Merten, both of Leverkusen, and Ludwig Rottmaier, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

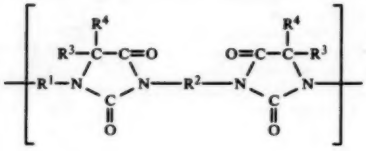
Filed May 3, 1985, Ser. No. 729,919

Claims priority, application Fed. Rep. of Germany, May 15, 1984, 3417941

Int. Cl.[4] B32B *15/08*; C08K *7/02, 7/12*

U.S. Cl. 428—209 **18 Claims**

1. A laminate comprising polyhydantoins of units attached head-to-tail corresponding to



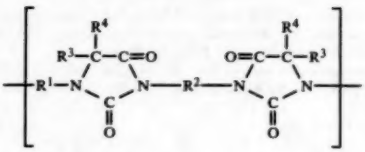
where

R^1 and R^2 are independently a C_2–C_{20}-alkylene radical, a C_2–C_{20}-alkylene radical substituted with halogen, a C_2–C_{20}-alkylene radical substituted with C_1–C_{10}-alkyl groups, or combinations thereof, a C_6–C_{14}-arylene radical, a C_5–C_{12}-cycloalkylene radical, or a C_7–C_{20}-aralkylene radical,

R^3 is hydrogen, R^4 is a radical —CH_2—COR^5, in which R^5 is an amino group, a C_1–C_{10}-alkylamino, a C_1–C_{10}-dialkylamino, a C_1–C_{10}-alkoxy or a C_6–C_{10}-aroxy group and

a fibrous filler or reinforcing material.

13. A process for producing a laminate of polyhydantoins of units attached head-to-tail corresponding to



where

R^1 and R^2 are independently a C_2–C_{20}-alkylene radical, a C_2–C_{20}-alkylene radical substituted with halogen, a C_2–C_{20}-alkylene radical substituted with C_1–C_{10}-alkyl groups, or combinations thereof, a C_6–C_{14}-arylene radical, a C_5–C_{12}-cycloalkylene radical, or a C_7–C_{20}-aralkylene radical,

R^3 is hydrogen, R^4 is a radical —CH_2COR^5, in which R^5 is an amino group, a C_1–C_{10}-alkylamino, a C_1–C_{10}-dialkylamino, a C_1–C_{10}-alkoxy or a C_6–C_{10}-aroxy group and

a fibrous filler or reinforcing material, comprising combining the polyhydantoins with the fibrous filler or reinforcing material to form a mass, then compressing and hardening the mass at elevated temperatures to form the laminate.

17. A circuit board for electronic components comprising a metal-coated laminate, where the laminate is in accordance with claim **1**.

4,702,954
POLYMER LAMINATE POSSESSING AN INTERMEDIATE WATER VAPOR TRANSMISSION BARRIER LAYER

Gary L. Duncan, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 754,051, Jul. 11, 1985, Pat. No. 4,582,753. This application Dec. 30, 1985, Ser. No. 814,836

The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.

Int. Cl.[4] B32B *3/26, 7/00*

U.S. Cl. 428—213 **13 Claims**

1. An opaque biaxially oriented polymer film laminate of lustrous satin appearance which comprises:

(a) at least one thermoplastic polymer matrix substrate layer within which is located a strata of voids;

positioned at least substantially within at least a substantial number of said voids is at least one spherical void-initiating particle which is phase distinct and incompatible with the matrix material, the void space occupied by said particle being substantially less than the volume of said void, with one generally cross-sectional dimension of said particle at least approximating a corresponding cross-sectional dimension of said void; and,

(b) at least one thermoplastic water vapor transmission barrier layer affixed to said thermoplastic substrate layer, said barrier layer being fabricated from a water absorbent polymer containing 0 to 40 weight parts of hygroscopic material uniformly distributed therein.

6. The polymer laminate of claim **1** wherein the substrate thickness is from about 30 to about 85% of said structure.

4,702,955

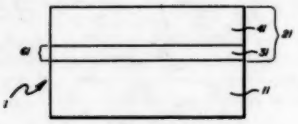
MULTILAYER DECORATIVE COATING

David Allred; Alan Kadin, both of Troy, and Purnachandra Pai, Birmingham, all of Mich., assignors to Ovonic Synthetic Materials Company, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 758,260, Jul. 24, 1985, abandoned. This application Jan. 27, 1986, Ser. No. 822,447

Int. Cl.[4] B32B 7/02, 17/06

U.S. Cl. 428—213 47 Claims



1. A reflecting article comprising a substrate having a coating thereon said coating comprising:

a partially oxidized transition metal thin film deposited, on the substrate said transition metal chosen from the group consisting of Group IVB, VB and VIB of the periodic table, the partially oxidized transition metal thin film being oxidized to a thickness to provide substantially constructive interference of a desired band of optical wavelengths, the oxide and metallic portions of the deposited thin film having indices of refraction to provide balanced reflectances at the thin film-air interface and at the transition metal-oxide interface, and the total thickness of the thin film being such to provide an integrated optical transmission coefficient.

4,702,956

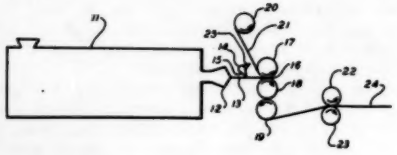
METHOD OF BONDING GLASS FIBERS OR OTHER SUBSTRATES TO VARIOUS POLYMERS BY OXIDIZING THE MOLTEN POLYMER SURFACE, AND ARTICLES PRODUCED THEREBY

George S. Wilson, Ringwood; Harvey E. Kline, Succasunna, and Joseph E. Mackey, East Hanover, all of N.J., assignors to Ausimont, U.S.A., Inc., Morristown, N.J.

Filed Dec. 12, 1985, Ser. No. 808,201

Int. Cl.[4] B32B 7/00

U.S. Cl. 428—251 13 Claims



1. The method of flame-treating molten polymer for improved adhesion to a web, comprising the steps of (a) extruding at least one polymer selected from the group consisting of ethylene/chlorotrifluoroethylene copolymer, ethylene/tetrafluoroethylene copolymer, polyvinylidene fluoride, copolyhexafluoroisopropylene-tetrafluoroethylene, vinylidene fluoride-tetrafluoroethylene copolymer, and polychlorotrifluoroethylene, (b) treating the surface of the extruded polymer with a flame, and (c) co-calendering the flame treated polymer with at least one web.

4,702,957

BINDERS FOR NONWOVENS BASED ON EVA-MALEATE COPOLYMERS

Paul R. Mudge, Somerville, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Sep. 8, 1986, Ser. No. 905,353

Int. Cl.[4] B32B 27/00

U.S. Cl. 428—288 20 Claims

1. A nonwoven fabric formed from a loosely assembled web of fibers bonded together with an aqueous emulsion; said aqueous emulsion being prepared by the emulsion polymerization of a vinyl ester of an alkanoic acid interpolymerized with:

(a) 10 to 30% by weight ethylene;

(b) 15 to 40% by weight of a C_4–C_{10} dialkyl maleate or the corresponding fumarate;

(c) 1 to 5% by weight of copolymerizable N-methylol containing monommer;

(d) 0 to 4% by weight of an olefinically-unsaturated carboxylic acid containing 3 to 6 carbon atoms; and

(e) 0 to 1% by weight of a polyolefinically unsaturated comonomer.

4,702,958

LASER RECORDING FILM

Masanori Itoh, and Fumihiko Hayashi, both of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Japan

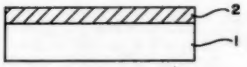
PCT No. PCT/JP85/00324, § 371 Date Jan. 23, 1986, § 102(e) Date Jan. 23, 1986, PCT Pub. No. WO86/00048, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 7, 1985, Ser. No. 834,271

Claims priority, application Japan, Jun. 11, 1984, 59-119263

Int. Cl.[4] B32B 5/16; G01D 15/10

U.S. Cl. 428—323 6 Claims



1. A laser recording film prepared by coating a transparent film with a recording medium comprising graphite particles, at least 95% of which have a particle diameter of 2 μm or below and at least 40% of which have a particle diameter of 0.2 μm or below and a binder.

4,702,959

MAGNETIC RECORDING MEDIUM

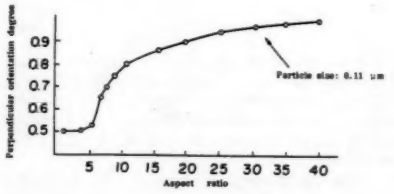
Toru Shimozawa, Saku; Masaharu Nishimatsu, Komoro, and Yoshiaki Saito, Saku, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Mar. 19, 1986, Ser. No. 841,223

Claims priority, application Japan, Mar. 19, 1985, 60-53394; Nov. 22, 1985, 60-261364

Int. Cl.[4] G11B 5/68, 5/70

U.S. Cl. 428—323 4 Claims



1. A magnetic recording medium, comprising

a non-magnetic substrate, a magnetic recording layer formed on one side of said substrate and a back coating layer

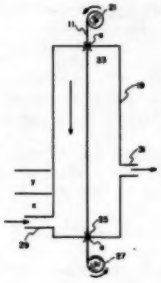
formed on the other side of said substrate, wherein said magnetic recording layer contains a hexagonal system plate crystal magnetic powder having a particle size of at most 0.2 micron, and wherein said back coating layer comprises a binder comprised of a radiation curable resin, wherein said back coating layer has an electrical resistance of at most 10^{10} Ω/cm², and wherein said back coating layer has E' of from 500–1500 kg/mm² and a surface roughness of at most 0.20 micron as measured at a cutoff of 0.17 mm by the 20 point average method.

4,702,960

SURFACE TREATMENT FOR CARBON AND PRODUCT

Abraham O. Ogman, Peabody, Mass., assignor to Avco Corporation, Providence, R.I.

Filed Jul. 30, 1980, Ser. No. 173,772
Int. Cl.⁴ B32B *9/00*; D02G *3/00*
U.S. Cl. 428—367 **2 Claims**



2. A filamentary reinforcement for metal matrix composite materials comprising:

a filamentary reinforcement having a carbon exterior surface with a single carbon-rich silicon carbide overlayer where the ratio of silicon to carbon varies continuously from zero at the interface in the carbon exterior surface of the filamentary reinforcement to a value intermediate zero and one at the exterior surface of the carbon-rich layer for enhancing the wettability of the carbon surface and the depth of the carbon-rich silicon layer is 0.25 microns ±20 percent.

4,702,961

METHOD OF MELT PROCESSING AND ARTICLE MADE OF A STABILIZED COPOLYMER OF VINYL CHLORIDE AND CHLOROTRIFLUOROETHYLENE

Daniel C. Chung, Bridgewater, and Kwang-Ho Chu, Flemington, both of N.J., assignors to Ausimont, U.S.A., Inc., Morristown, N.J.

Continuation of Ser. No. 564,598, Dec. 22, 1983, abandoned. This application Oct. 7, 1985, Ser. No. 783,813
Int. Cl.⁴ B32B *15/00*
U.S. Cl. 428—379 **2 Claims**

1. A coated wire comprising a wire; and

a melt coating on the wire comprising 70 to 95 percent by weight of vinyl chloride and 5 to 30 percent by weight of chlorotrifluoroethylene.

4,702,962

COATING COMPOSITION

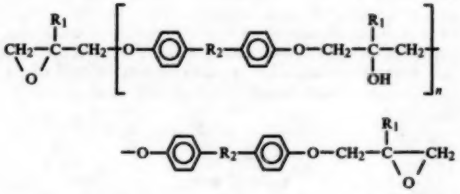
Hidehiko Kojo, Koshigaya; Koji Akimoto, Tokyo, and Kazuhiro Urihara, Kasukabe, all of Japan, assignors to Asahi Denka Kogyo K. K., Tokyo, Japan

Division of Ser. No. 667,250, Nov. 1, 1984, Pat. No. 4,560,732. This application Oct. 2, 1985, Ser. No. 782,853
Claims priority, application Japan, Nov. 11, 1983, 58-212200; Nov. 30, 1983, 58-226528
Int. Cl.⁴ C08G *59/40*
U.S. Cl. 428—418 **7 Claims**

1. A method of providing an anticorrosive coating on a metal substrate which comprises coating the metal substrate with an adherent coating film of a coating composition containing, as essential components, the high molecular weight reaction product of the reaction between;

(A) an epoxide resin having the following general formula (1):

(1)



wherein R_1 is H or CH_3; R_2 is —CH_2—or

and n is a number of from 0 to 35, and

(B) a phosphorus compound selected from the group consisting of metal salts of acids of phosphorus having at least one P-OH group,

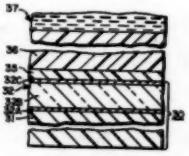
wherein the molar ratio of epoxy groups in (A) to the hydroxy groups or corresponding salts thereof in (B) is from 0.85 to 1.15 and said reaction product is dissolved or dispersed in an organic solvent.

4,702,963

FLEXIBLE POLYMER FILM WITH VAPOR IMPERMEABLE COATING

Roger W. Phillips; Craig M. Shevlin, both of Santa Rosa, and John S. Matteucci, Healdsburg, all of Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Continuation-in-part of Ser. No. 250,731, Apr. 3, 1981, abandoned. This application Apr. 12, 1982, Ser. No. 367,382
Int. Cl.⁴ B32B *17/06*
U.S. Cl. 428—426 **15 Claims**



1. An article comprising a flexible polymer substrate and a thin film coating carried on at least one surface of said substrate

and characterized by substantial transparency in the visible portion of the electromagnetic readiation spectrum, the barrier properties of substantially lower gas and vapor permeability, and the capability of withstanding retorting conditions of a superheated water or steam sterilization operation by maintaining adhesion of said coating to said substrate and retaining said barrier properties, said thin film coating comprising a composite of at least two separate inorganic materials preselected from a group of materials which have been predetermined to produce all of said properties concurrently; said composite thin film coating comprising a thin film adhesion layer formed directly on said substrate of first material selected from the group consisting of chromium, tantalum, nickel, molybdenum, oxides of chromium, alloys of chromium with tantalum and nickel, a co-deposited mixture of chromium and silicon monoxide having at least about twenty percent chromium by weight, and a lead-aluminum silica glass composition to confer on said article said property of being capable of withstanding said retorting conditions; and a thin film barrier layer formed on said adhesion layer of a second material selected from the group consisting of silicon monoxide, silicon dioxide and mixtures of silicon dioxide with a glass modifier selected from the group consisting of oxides of magnesium, barium, and calcium, and fluorides of alkalai earth elements to confer on said article said property of substantially lower gas and vapor permeability.

4,702,964
FIXING ROLL

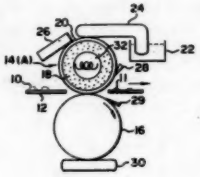
Yasuo Hirano, and Kazuo Nojima, both of Numazu, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Jul. 12, 1985, Ser. No. 754,792

Claims priority, application Japan, Jul. 18, 1984, 59-149197; Jul. 30, 1984, 59-157255; Jul. 31, 1984, 59-160363; Dec. 3, 1984, 59-256202

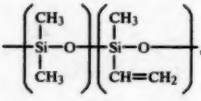
Int. Cl.[4] B32B *9/04*

U.S. Cl. 428—447 **20 Claims**



1. In a fixing roll for electrophotography comprising a metal core and a silicone rubber surface layer, the improvement which comprises:

said silicone rubber surface layer is a heat-cured, crosslinked, silicone rubber composition prepared by incorporating a crosslinking agent into a blend consisting essentially of silica, a polysiloxane polymer consisting essentially of recurring units of the formulas



and a material selected from the group consisting of magnesium hydroxide and highly active magnesium oxide, and heating said blend to a crosslinking temperature effective to convert said blend to said heat-cured, crosslinked, silicone rubber composition.

4,702,965
LOW VACUUM SILICON THIN FILM SOLAR CELL AND METHOD OF PRODUCTION

Pao-Hsien Fang, Belmont, Mass., assignor to Richard J. Birch, Wellesley, Mass., a part interest

Continuation of Ser. No. 497,400, May 23, 1983, abandoned, which is a continuation-in-part of Ser. No. 362,798, Mar. 29, 1982, abandoned, which is a continuation of Ser. No. 87,282, Oct. 22, 1979, abandoned. This application Dec. 17, 1985, Ser. No. 810,533

Int. Cl.[4] B05D *5/12*

U.S. Cl. 428—457 **7 Claims**

1. A method for producing semiconductor solar cells comprising the steps of:

establishing a vacuum environment of low 10^{-4} to high 10^{-5} range;

positioning a deposition substrate in said vacuum environment;

introducing a gaseous plasma into said vacuum environment to replace the residual gases therein; and,

depositing successive passivation and semiconductor layers onto said deposition substrate in the presence of said gaseous plasma with at least some of said semiconductor layers being doped, said semiconductor layers being deposited by evaporation with the semiconductor material forming said semiconductor layers coming from a solid source.

4,702,966
OXYGEN SCAVENGER

Christopher J. Farrell, Arlington Heights, and Boh C. Tsai, Rolling Meadows, both of Ill., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 228,089, Jan. 23, 1981, Pat. No. 4,536,409. This application Jun. 5, 1985, Ser. No. 741,409

Int. Cl.[4] B32B *27/00*

U.S. Cl. 428—500 **14 Claims**

1. An article comprised of polymeric protective material having incorporated therein a dry oxygen scavenger material, the oxygen scavenger material being capable of a passive state for prolonged periods of time during which the oxygen scavenger will not directly react with oxygen, and triggerable to an active state when wetted with water which has selectively permeated the protective material from outside the article, whereupon the oxygen scavenger will directly react with oxygen,

wherein said protective material is substantially resistant to permeation by water at ambient temperature and has enhanced transmission of water at elevated temperatures and therefore is selectively capable of permeation by water at elevated temperatures to thereby selectively permit the water to contact said oxygen scavenger material to convert it from the passive to the active state.

4,702,967
MULTIPLE-LAYER, MULTIPLE-PHASE TITANIUM/NITROGEN ADHESION/DIFFUSION BARRIER LAYER STRUCTURE FOR GOLD-BASE MICROCIRCUIT INTERCONNECTION

Jimmy C. Black, and Bruce E. Roberts, both of Palm Bay, Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Jun. 16, 1986, Ser. No. 874,393

Int. Cl.[4] B32B *15/04*; H01L *23/54*

U.S. Cl. 428—620 **16 Claims**

1. A multiple layer structure for adhering gold to an underlying substrate comprising:

a first layer of titanium overlying said substrate;

a second layer of titanium nitride overlying said first layer;

a third layer of nitrogen-modified titanium overlying said second layer and being of a thickness large enough to provide sufficient titanium for adherence with an overlying gold layer to be formed thereon but less than that which would cause titanium-gold compounds to be

formed on the surface of said overlying gold layer as a result of subsequent heating; and

a gold layer overlying said third layer.

4,702,968

HEAT RESISTANT PRECOATED STEEL SHEET AND PROCESS FOR THE PRODUCTION THEREOF

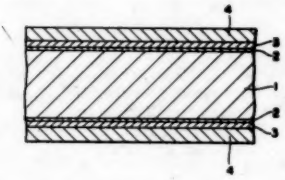
Kenichi Masuhara; Kazuo Yamayoshi, and Kouji Wakabayashi, all of Chiba, Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

Filed Feb. 3, 1986, Ser. No. 825,262

Claims priority, application Japan, Feb. 2, 1985, 60-18986

Int. Cl.[4] B32B *15/08*; C23C *22/24*

U.S. Cl. 428—623 12 Claims



4. A precoated steel sheet suitable for use in the manufacture of a muffler of an automobile exhaust gas system comprising:

a hot dip aluminized steel sheet,

a chromate pretreatment layer formed on each surface of said hot dip aluminized steel sheet and having a chromium pick-up of 10 to 50 mg/m^2,

a primer coat formed on said pretreatment layer and comprising a cured polyamide imide resin and 8 to 52 parts by weight, based on 100 parts by weight of said resin, of strontium chromate intimately admixed with said resin,

a top coat formed on one of the primer coats and comprising a cured silicone-modified polyester resin with a modification degree of from 30 to 50% and 8 to 32 parts by weight, based on 100 parts by weight of said resin, of aluminum scale intimately admixed with said resin, and

a black top coat formed on the other primer coat and comprising a cured silicone-modified polyester resin with a modification degree of from 30 to 50% having intimately admixed therewith 1.5 to 5 parts by weight of aluminum scale, 3 to 5 parts by weight of a non calcined black pigment and 4 to 6 parts by weight of silica powder, based on 100 parts by weight of said resin.

4,702,969

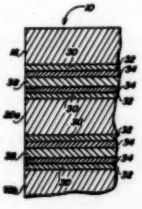
LAMINATE BONDING METHODS FOR NONFERROUS METALLIC FLUIDIC DEVICES

Bela Bunkoczy, Chandler; James A. Wendorff, and Walt W. Battin, both of Phoenix, all of Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 736,878, May 22, 1985, abandoned. This application Jul. 2, 1986, Ser. No. 881,879

Int. Cl.[4] B32B *15/20, 15/04*; B23K *35/26, 1/20*

U.S. Cl. 428—635 21 Claims



1. A method of bonding a duality of aluminum or titanium metallic fluidic laminae each having a side surface, said method comprising the steps of:

(a) coating each of the side surfaces with a layer of zinc;

(b) coating each of the zinc layers with a layer of nickel;

(c) coating each of the nickel layers with a layer of solder material;

(d) positioning the solder material layers in intimate contact; and

(e) fusing the contacting solder material layers by heating the coated laminae without appreciably softening the metallic fluidic laminae.

4,702,970

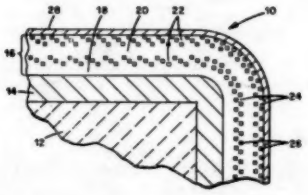
COMPOSITE COATINGS ON CERAMIC SUBSTRATES

Vinod K. Sarin, Lexington, Mass., and Hans E. Hintermann, Ins, Switzerland, assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jan. 20, 1987, Ser. No. 5,000

Int. Cl.[4] B32B *9/00*

U.S. Cl. 428—688 13 Claims



1. A wear resistant article comprising:

a hard ceramic substrate body; and

a fully dense, adherent, wear resistant, composite ceramic coating having at least two phases on the substrate comprising:

a continuous oxide layer about 0.1–20 microns thick of a material selected from the group consisting of the oxides of aluminum, zirconium, and yttrium; and

at least one discontinuous additional phase dispersed as discrete particles within the oxide layer, of at least one material selected from the group consisting of oxides of aluminum, zirconium, and yttrium, the at least one material being different from that of the oxide layer.

4,702,971

SULFUR TOLERANT COMPOSITE CERMET ELECTRODES FOR SOLID OXIDE ELECTROCHEMICAL CELLS

Arnold O. Isenberg, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 28, 1986, Ser. No. 867,860

Int. Cl.[4] H01M *8/12*

U.S. Cl. 429—31 23 Claims

1. An electrode bonded to a solid, ion conducting electrolyte, said electrode comprising:

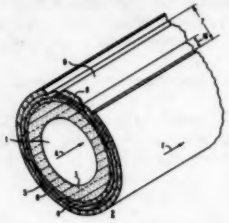
(A) particles of an electronic conductor,

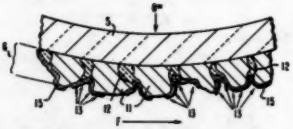
(B) an ion conducting ceramic metal oxide partially surrounding said particles, and bonded to the electrolyte, and

(C) an ionic-electronic conductive coating on said ion conducting ceramic metal oxide and exposed portions of the particles.

21. A tubular electrochemical cell containing an exterior electrode bonded to the exterior of a tubular, solid, oxygen ion conducting electrolyte, where the electrolyte is also in contact with an interior electrode, said exterior electrode comprising particles of an electronic conductor partly embedded in a skeletal structure of a dense, essentially only ionic conductive ceramic metal oxide, where the electrolyte and skeletal struc-

ture comprise stabilized zirconia, and where the particles and skeletal structure are contacted by a separate, ionic-electronic





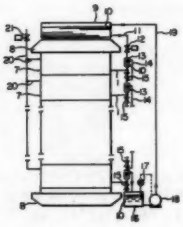
conductive coating which consists essentially of an oxide selected from the group consisting of doped ceria, doped urania, and mixtures thereof.

4,702,972

ELECTROLYTE REPLENISHING SYSTEM FOR A LAMINATED FUEL CELL

Masaaki Matsumoto, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 18, 1986, Ser. No. 932,096
Claims priority, application Japan, Nov. 20, 1985, 60-258639
Int. Cl.[4] H01M 8/04
U.S. Cl. 429—34 **16 Claims**



1. An electrolyte replenishing system for a laminated type fuel cell comprising:

a cell block having a plurality of cells;

an electrolyte replenishing throat for supplying an electrolyte to said cell block, the outlet of which is connected to said cell block;

an electrolyte exhausting valve for exhausting the excess electrolyte, the inlet of which is connected to the inlet of said electrolyte replenishing throat;

a head pressure adjusting vessel for regulating the head pressure of the replenishing electrolyte which is brought into said cell block, the outlet of which is connected to the inlet of said electrolyte exhausting valve and to the inlet of said replenishing throat;

an electrolyte replenishing valve the output side of which is connected to the input of said head pressure adjusting vessel;

an overflow line for providing a predetermined head pressure in said head pressure adjusting vessel, one end of which is connected to said head pressure adjusting vessel and the other end of which is connected to the output of said electrolyte exhausting valve;

an exhausted electrolyte tank for storing the electrolyte exhausted from said electrolyte exhausting valve and overflow line, to which the outlet of said electrolyte exhausting valve and the other end of said overflow line are connected;

a pump for returning the electrolyte stored in said exhausted electrolyte tank to the inlet of said electrolyte replenishing valve, the input of which is connected to the outlet of said exhausted electrolyte tank, and the output of which is connected to the input side of said electrolyte replenishing valve; and

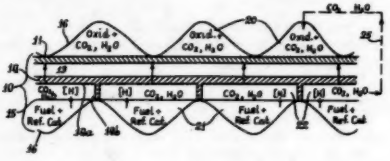
a venting line for exhausting gas in a reservoir in the cell block, which is connected to said cell block at the opposite side to said electrolyte replenishing throat.

4,702,973

DUAL COMPARTMENT ANODE STRUCTURE

Leonard G. Marianowski, South Holland, Ill., assignor to Institute of Gas Technology, Chicago, Ill.

Filed Aug. 25, 1986, Ser. No. 899,878
Int. Cl.[4] H01M 8/14
U.S. Cl. 429—41 **17 Claims**



1. A dual compartment anode structure for use in a molten carbonates fuel cell, said anode comprising: an electrolyte porous metallic plate structure having one face adapted to contact said electrolyte and an opposite face having a plurality of ribs extending therefrom; a hydrogen ion porous and molecular hydrogen and electrolyte non-porous metallic foil having one face in contact with the ends of said ribs, said opposite face and ribs of said porous metallic plate structure and said one face of said metallic foil defining an anode reaction gas compartment; and a corrugated metallic current collector having a plurality of peaks and having one face at said peaks in contact with the opposite face of said metallic foil, said one face of said corrugated metal current collector and said opposite face of said metallic foil defining an anode fuel gas compartment.

4,702,974

ELECTROCHEMICAL GENERATOR UTILIZING SOLID POLYMER-SALT COMPLEX

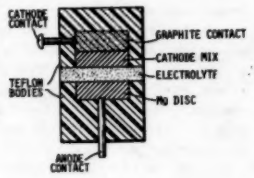
Thomas D. Gregory, and Ronald J. Hoffman, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 799,699, Nov. 19, 1985, abandoned. This application Oct. 27, 1986, Ser. No. 923,364
Int. Cl.[4] H01M 6/18
U.S. Cl. 429—50 **16 Claims**

1. In an electric current producing primary electrochemical cell comprising an anode, a cathode, and an electrolyte which is a solid at a temperature of about 20° C. to 100° C., the improvement comprising using as said electrolyte an electrolytically active solid polymer and salt complex, said polymer derived from at least one monomer comprising at least one heteroatom and wherein said salt is at least one of a salt of the formula:

$$(R)_3CMX_n$$

wherein M is selected from the group consisting of at least one of boron, phosphorus, antimony, and arsenic, and wherein X is



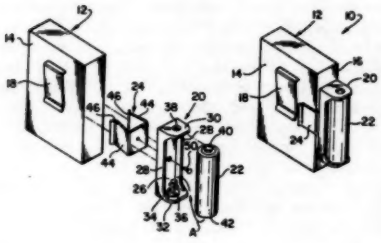
halogen, n is 4 or 6, and R is aryl of 6–18 carbon atoms, alkyl of 1–8 carbon atoms, or alkaryl of 7–26 carbon atoms.

4,702,975

SPARE BATTERY HOLDER FOR A BATTERY-OPERATED DEVICE

Roy Fields, 51 Thompson St., Tuckahoe, N.Y. 10707

Filed Jan. 12, 1987, Ser. No. 2,737
Int. Cl.⁴ H01M *2/10*
U.S. Cl. 429—100 **4 Claims**



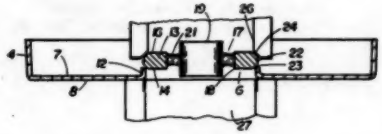
1. A spare battery holder for a battery operated device of the type enclosed in a rectangular housing, said holder comprising a U-shaped clip of springy construction material adapted to be placed in engaged relation about a side of said rectangular housing, an open battery receptacle attached to said clip so as to extend longitudinally of said rectangular housing and provided with upper and lower lateral extensions having battery gripping means thereon in facing relation to each other spaced apart a distance approximating the longitudinal size of a spare battery to be placed in said receptacle, said spare battery being of the type having a positive electrical contact in the form of a small diameter projection extending from one end and a negative electrical contact in the form of a flat surface defining its opposite end, said battery gripping means on said one lateral extension for said spare battery positive electrical contact being a small diameter opening sized to receive in seated relation therein said battery projection and on said other lateral extension for said spare battery negative electrical contact an attached helical spring adapted to assume a compressed interposed position between said lateral extension and said battery flat surface, whereby said spare battery is removably held under spring urgency in said receptacle similar to the manner in which it is used during powering service and thus under conditions unlikely to cause damage to said battery.

4,702,976

HERMETIC TERMINAL ASSEMBLY AND METHOD OF MANUFACTURING SAME

Benjamin Bowsky, Maineville; Glenn A. Honkomp, Loveland; Larry G. Burrows, Cincinnati, and Edward E. Wilson, Milford, all of Ohio, assignors to Emerson Electric Co., St. Louis, Mo.

Filed Sep. 19, 1986, Ser. No. 909,300
Int. Cl.⁴ H01M *2/30*
U.S. Cl. 429—181 **10 Claims**



1. A terminal pin and end closure structure for an hermetic terminal assembly comprising:

an end closure including a main body portion having an aperture therein and an extended peripheral wall portion integral therewith to surround said aperture and extend at a preselected angle to said main body portion for a preselected distance with the extremity of said extended peripheral wall portion presenting inner and outer edges;

sealing means geometrically sized to conform with and totally cover said aperture in said end closure in cooperative overlapping and sealed relation with the entirety of said inner edge of said extended peripheral wall portion, said sealing means having opposed side faces with an aperture disposed therethrough; and

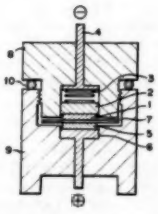
a terminal pin sealed in said aperture of said sealing means.

4,702,977

SECONDARY BATTERY USING NON-AQUEOUS SOLVENT

Kazuya Hiratsuka, Yokohama; Yuichi Sato, Atsugi; Yoshiyasu Aoki, Tokyo; Hiroshi Yui, Yokkaichi; Mitsutaka Miyabayashi, Yokkaichi, and Akira Itsubo, Yokkaichi, all of Japan, assignors to Toshiba Battery Co., Ltd. and Mitsubishi Petrochemical Co., Ltd., both of Tokyo, Japan

Filed Apr. 24, 1986, Ser. No. 855,826
Claims priority, application Japan, Apr. 30, 1985, 60-92437; Apr. 30, 1985, 60-92438
Int. Cl.⁴ H01M *4/38, 10/40*
U.S. Cl. 429—194 **20 Claims**



1. A secondary battery using a non-aqueous solvent which comprises in a non-aqueous solvent secondary battery comprising a positive electrode capable of recharging, an electrolytic solution dissolving an electrolyte in a non-aqueous solvent and a negative electrode capable of recharging, the improvement wherein said negative electrode comprises a carbonaceous material obtained by the carbonization of at least one of a compound selected from the group consisting of an organic high molecular compound, a condensed polycyclic hydrocarbon compound and polycyclic heterocyclic compound,

and having a pseudographite structure of an atomic ratio of hydrogen/carbon being not more than 0.15, a spacing of (002) planes as determined by X-ray wide-angle diffraction being 3.37 Å to 3.75 Å and a crystallite size in the direction of c axis being 8 Å to 150 Å.

4,702,978

ELECTROCHEMICAL CELL

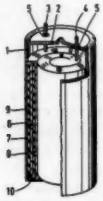
Jacobus J. F. G. Heuts, and Gerrit Frens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 18, 1986, Ser. No. 932,058

Claims priority, application Netherlands, Jun. 26, 1986, 8601675

Int. Cl.[4] H01M *4/36*

U.S. Cl. 429—218 3 Claims



1. An electrochemical cell comprising a negative electrode, the electrochemically active material of which consists of an intermetallic compound forming a hydride with hydrogen, which compound has the $CaCu_5$-structure and the compositional formula AB_mC_n, where m+n is between 4.8 and 5.4, where n is between 0.05 and 0.6, in which A consists of Mischmetall or of at least one element selected from the group consisting of Y, Ti, Hf, Zr, Ca, Th, La and the remaining rare earth metals, in which the total atomic quantities of the elements Y, Ti, Hf and Zr may not be more than 40% of A, in which B consists of two or more elements selected from the group consisting of Ni, Co, Cu, Fe and Mn, the maximum atomic quantity per gram atom of A is being for Ni: 3.5, for Co: 3.5, for Cu: 3.5, for Fe: 2.0 and for Mn: 1.0, and in which C consists of of at least one element selected from the group consisting of Al, Cr and Si in the following atomic quantities: Al: 0.05–0.6, Cr: 0.05–0.5 and Si: 0.05–0.5, characterized in that the electrochemically active material of the negative electrode also comprises an intermetallic compound forming a hydride with hydrogen, of the compositional formula $DNihd\ pE_q$ in an amount from 5 to 45% by weight calculated on the total amount of electrochemically active material, where p+q is between 4.8 and 5.4, where p is between 3.5 and 5.4, where q has a value from 0 to 1.5, where D is selected from the group formed by La and Mischmetall, and where E consists of one or more elements selected from the group consisting of Co, Cr, Mn and Cu.

4,702,979

METHOD OF FORMING IMAGE

Satoshi Otomura, Chiba, and Narihito Kojima, Numazu, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 765,904, Aug. 14, 1985, abandoned. This application Jul. 24, 1986, Ser. No. 889,648

Claims priority, application Japan, Aug. 22, 1984, 59-173388

Int. Cl.[4] G03G *13/24, 17/02*

U.S. Cl. 430—52 14 Claims

1. A method of forming an image, which comprises applying voltage on a photosensitive material comprising an electroconductive cathode layer in contact with a photoconductive layer consisting essentially of a charge-generating organic pigment and a metallic electroconductive anode layer comprising at least one metal selected from the group consisting of Al, Ta, V, Nb, Zr, Ti, Si, Pb, W, Mg, Zn, Cd, Ni, Co and Fe, on a substrate in such a manner as to make said electroconductive anode layer positive and said photoconductive layer negative and simultaneously irradiating optical information on said positive electroconductive anode layer or said negative photoconductive layer, thereby causing an anodic ion reaction on the interface between said electroconductive anode layer and said photoconductive layer to selectively change the spectral absorption properties of at least one of said electroconductive anode layer and said photoconductive layer depending on the irradiated optical information; said photosensitive material comprising said metallic electroconductive anode layer applied on said substrate and said photoconductive layer overlaid on said electroconductive anode layer.

4,702,980

CONDUCTIVE SHEET AND ELECTROSTATIC RECORDING MEDIUM FORMED THEREFROM

Kazuo Matsuura, Kusatsu; Katuzi Nakahara, Shiga, and Kenji Hayashi, Kyoto, all of Japan, assignors to Toray Industries, Incorporated, Tokyo, Japan

Continuation of Ser. No. 636,351, Jul. 31, 1984, abandoned. This application Jun. 10, 1986, Ser. No. 872,671

Claims priority, application Japan, Aug. 3, 1983, 58-141239

Int. Cl.[4] G03G *5/14*

U.S. Cl. 430—63 12 Claims

1. An electrostatic recording medium which comprises an organic polymer sheet (A), a conductive layer, said conductive layer comprising at least one thin metal oxide layer (B) having a thickness within the range of 5 to 1,000 A, said metal oxide layer being substantially insulating and at least one discontinuous metal layer (C) consisting essentially of at least one metal selected from the group consisting of Pt, Pd, Rh, and Ir, said discontinuous metal layer comprising an island-like fine particle structure, the average size of said particle being within the range of 10^{-5} to 10^{-2} μm^2, the surface resistivity of said conductive layer being in the range of 10^4 to 10^9 ohm per square and a dielectric layer (D), whereupon the electrostatic image is formed, said layers laminated in the layer order (A), (B) (C), (B) and (D) or (A), (C), (B) and (D).

4,702,981

PHOTOCONDUCTIVE MEMBER AND SUPPORT FOR SAID PHOTOCONDUCTIVE MEMBER

Yasuyuki Matsumoto, Toride; Keiichi Murai, Kashiwa; Tadaji Fukuda, Yokohama, and Kyosuke Ogawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 599,522, Apr. 12, 1984, abandoned. This application Jun. 6, 1986, Ser. No. 873,444

Claims priority, application Japan, Apr. 18, 1983, 58-67029

Int. Cl.[4] G03G *5/082, 5/10*

U.S. Cl. 430—69 23 Claims

1. A photoconductive member having a mirror-finished support comprising aluminum as the main component and a photoconductive layer which is provided on the support and contains an amorphous material comprising silicon atoms as a matrix and at least hydrogen and/or hydrogen, wherein said support comprises an aluminum alloy with an Fe content of 2000 ppm by weight or less, said support having reduced numbers of hard spots and enhanced resistance to surface defects upon said mirror-finishing.

4,702,982

ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER COMPRISING DISAZO PIGMENT

Masakazu Matsumoto, Yokohama; Takao Takiguchi, Tokyo; Masataka Yamashita, Kawasaki; Shoji Umehara, Fuchu, and Shozo Ishikawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 22, 1986, Ser. No. 865,849

Claims priority, application Japan, May 31, 1985, 60-119116; Jun. 3, 1985, 60-118978; Jun. 7, 1985, 60-122757

Int. Cl.[4] G03G 5/06

U.S. Cl. 430—72 10 Claims

1. An electrophotographic photosensitive member having a photosensitive layer on a substrate, said photosensitive layer comprising an azo pigment selected from those of the formulae (1) to (3):

$$A-N=N-Ar_{11}-NH-Ar_{12}-N=N-A \quad (1)$$

$$A-N=N-Ar_{21}-CH=CH-Ar_{22}-NH-Ar_{23}-(CH=CH-Ar_{24})_n-N=N-A \quad (2)$$

$$A-N=N-Ar_{31}-\underset{H}{N}-Ar_{32}-N=N-Ar_{33}-N=N-A \quad (3)$$

wherein A represents a coupler residue having a phenolic OH group, each of Ar_{11}, Ar_{12}, Ar_{21}, Ar_{22}, Ar_{23}, Ar_{24}, Ar_{31}, Ar_{32} and Ar_{33} represents a phenylene group, a divalent polycyclic or fused polycyclic aromatic group or a divalent heterocyclic group which may have substituent, with proviso that Ar_{11} and Ar_{12} cannot both be phenylene groups which may have substituent; and n is 0 or 1.

4,702,983

ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISING BIS-AZO PIGMENT

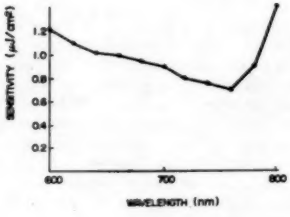
Kozo Haino; Kazuhiro Emoto, and Akira Itoh, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jan. 20, 1987, Ser. No. 4,494

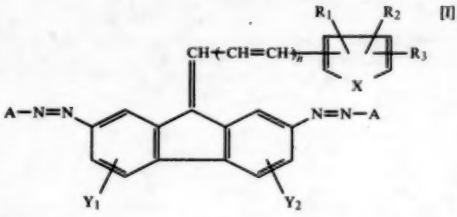
Claims priority, application Japan, Jan. 22, 1986, 61-12625; Jan. 22, 1986, 61-12626; Dec. 2, 1986, 61-287287

Int. Cl.[4] G03G 5/06, 5/14

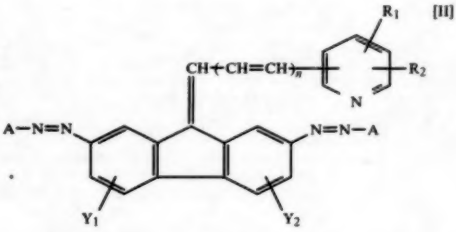
U.S. Cl. 430—75 6 Claims



1. An electrophotographic photoreceptor which comprises a conductive support and a light-sensitive layer thereon containing a bis-azo pigment represented by the following general formula [I] or [II]:



wherein X represents —O—, —S— or >N—R_4 where R_4 represents a hydrogen atom, an alkyl group or an aralkyl group, R_1, R_2 and R_3 each represent a hydrogen atom, an alkyl group, an alkoxy group, an aryl group or two of R_1, R_2 and R_3 being a group of atoms necessary to form a condensed ring by combination of them, Y_1 and Y_2 each represent a hydrogen atom, a halogen atom, an alkyl group or an alkoxy group, A represents a coupler residue necessary to produce an azo pigment and n is 0 or 1;



wherein Y_1 and Y_2 each represent a hydrogen atom, a halogen atom, an alkyl group or an alkoxy group, R_1 and R_2 each represent a hydrogen atom, an alkyl group, an alkoxy group or a group of atoms necessary to form a condensed ring by combination of R_1 and R_2, A represents a coupler residue necessary to produce an azo pigment and n is 0 or 1.

4,702,984

POLYBUTYLENE SUCCINIMIDE AS ADJUVANT FOR ELECTROSTATIC LIQUID DEVELOPER

Lyla M. El-Sayed, West Chester, Pa., and Arthur J. Taggi, Hockessin, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Apr. 30, 1986, Ser. No. 857,349

Int. Cl.[4] G03G 9/12

U.S. Cl. 430—115 22 Claims

1. An improved electrostatic liquid developer consisting essentially of

(A) a nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount.

(B) thermoplastic resin particles having a plurality of fibers integrally extending therefrom and an average by area particle size of less than 10 μm.

(C) a nonpolar liquid soluble ionic or zwitterionic compound,

(D) a charge adjuvant taken from the group consisting of a polyhydroxy compound and an aminoalcohol compound,

(E) a colorant, and

(F) a polybutylene succinimide.

4,702,985

AMINOALCOHOLS AS ADJUVANT FOR LIQUID ELECTROSTATIC DEVELOPERS

James R. Larson, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 28, 1986, Ser. No. 856,392
Int. Cl.[4] G03G *9/12*
U.S. Cl. 430—115 16 Claims

1. An electrostatic liquid developer having improved charging characteristics consisting essentially of:
(A) nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount,
(B) thermoplastic resin particles having an average by area particle size of less than 10 μm,
(C) nonpolar liquid soluble ionic or zwitterionic compound, and
(D) at least one aminoalcohol compound.

4,702,986

ELECTROPHOTOGRAPHIC METHOD USES TONER OF POLYALKYLENE AND NON-MAGNETIC INORGANIC FINE POWDER

Eiichi Imai, Narashino; Kiichiro Sakashita, Kawasaki; Seiichi Takagi, Yokohama, and Tsutomo Kukimoto, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 27, 1985, Ser. No. 769,951
Claims priority, application Japan, Aug. 30, 1984, 59-182284; Aug. 31, 1984, 59-182169; Apr. 19, 1985, 60-82665; Apr. 22, 1985, 60-84613
Int. Cl.[4] G03G *13/08*
U.S. Cl. 430—120 22 Claims

1. An image forming method which comprises:
forming electrostatic latent images on a photosensitive member having a surface hardness of 8 g or more;
developing the electrostatic latent images with a dry developer comprising
(a) toner particles comprising 100 parts by weight of a binder resin and 1–20 parts by weight of polyalkylene having a ratio of weignt average molecular weight to number average molecular weight of 5–8 and Z average molecular weight determined by gel permeation chromatography of 10,000–200,000, and containing 5–60% by weight of a component soluble in n-hexane at boiling point, the toner particles having a kinetic friction coefficient of 0.20–0.50, and
(b) non-magnetic inorganic fine powder having BET specific surface area according to a nitrogen adsorbing method of 0.5–500 m^2/g;
transferring the developed visible images to a receiving member; and
removing the toner particles remaining on the photosensitive member by a cleaning means accompanying abrasion.

4,702,987

DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY

Masakazu Fukuchi, and Satoshi Haneda, both of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan

Filed Dec. 5, 1986, Ser. No. 938,557
Claims priority, application Japan, Dec. 28, 1985, 60-298509; Dec. 31, 1985, 60-299095
Int. Cl.[4] G03G *13/09*
U.S. Cl. 430—122 8 Claims

1. A method for reversal developing an electrostatic latent image on the surface of an electrostatic image support member which comprises the steps of:
(1) forming an electrostatic latent image on said surface,
(2) controlling the rate of feeding an electrostatically charged developer to a developing region within a range of 0.01 g/cm^2 to 0.04 g/cm^2,
(3) transferring said developer into said developing region by means of a developer transfer member, and
(4) applying an a.c. field between said electrostatic image support member and said developer transfer member whereby to develop said electrostatic latent image in accordance with a non-contact developing system.

4,702,988

PROCESS FOR PRODUCING TONER FOR DEVELOPING ELECTROSTATIC IMAGES

Hiroshi Fukumoto, Kawasaki; Toshikazu Ohnishi, and Kohzoh Arahara, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 25, 1987, Ser. No. 18,535
Claims priority, application Japan, Mar. 3, 1986, 61-45917
Int. Cl.[4] G03G *9/12*
U.S. Cl. 430—137 24 Claims

1. A process for producing a toner for developing electrostatic latent images, comprising
(a) preliminarily dispersing a monomer composition comprising at least a polymerizable monomer and a colorant in a liquid dispersion medium which is substantially mutually-insoluble with the monomer and contains a fine powdery dispersion stabilizer, thereby to form a liquid dispersion containing the preliminarily dispersed monomer composition;
(b) pressurizing the liquid dispersion up to a pressure of 10 kg/cm^2 or above;
(c) ejecting the dispersion into a low pressure section to form particles of the monomer composition; and
(d) subjecting the particles of the monomer composition to suspension polymerization, thereby to produce toner particles.

4,702,989

PROCESS FOR PRODUCING PRESSURE-FIXABLE ELECTROPHOTOGRAPHIC TONERS

Norihide Sugiyama; Katsuro Funato, both of Shizuoka; Hiroshi Nagase, Tokyo; Seiichi Yamamoto, Tokyo, and Shigeo Miyamori, Tokyo, all of Japan, assignors to Fujikura Kasei Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 634,864, Jul. 26, 1984. This application Apr. 7, 1986, Ser. No. 849,369
Claims priority, application Japan, Jul. 26, 1983, 58-135075; Mar. 12, 1984, 59-46951
Int. Cl.[4] G03G *11/00*
U.S. Cl. 430—137 8 Claims

1. A process for producing a pressure-fixable toner which comprises the steps of: dispersing or dissolving a starting material mixture containing (a) a colorant and/or magnetic particles, (b) a pressure-fixable binding material selected from the group consisting of higher fatty acids, metallic salts of higher fatty acids, derivatives of higher fatty acids, amides of higher fatty acids, natural waxes, synthetic waves, rosin derivatives, polyolefins, olefin copolymers, silicone resins, alkyd resins, natural resin-modified phenol resins, maleic acid-modified phenol resins, phenol resins, rubber and styrene resins; and (c) a capsule wall-forming resin selected from the group consisting of homopolyumers of styrene or vinyl monomers, copolymers of styrene and vinyl monomers, and epoxy resins in an organic solvent; dispersing the resulting dispersion or solution in an aqueous dispersion-stabilizing solution; then gradually heating the thus-obtained dispersion up to the azeotropic temperature of the water-organic solvent to drive off the major portion of the organic solvent from the dispersed droplets and phase-separating the capsule wall-forming resin dissolved in the organic solvent on the surface of the dispersed toner droplets containing components (a) and (b) to form a capsule wall around the surface of the droplets; dispersing the resulting encapsulated toner in a lower alcohol to extract and remove the organic solvent remaining within the encapsulated toner; and thereafter drying the encapsulated toner.

4,702,990

PHOTOSENSITIVE RESIN COMPOSITION AND PROCESS FOR FORMING PHOTO-RESIST PATTERN USING THE SAME

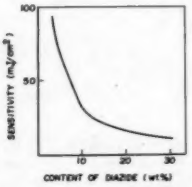
Akinobu Tanaka; Masao Morita; Saburo Imamura, all of Mito; Toshiaki Tamamura, Katsuta, and Osamu Kogure, Mito, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed May 10, 1985, Ser. No. 733,505

Claims priority, application Japan, May 14, 1984, 59-94620; Feb. 18, 1985, 60-28250

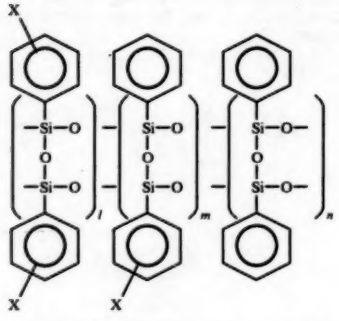
Int. Cl.[4] G03C *1/54, 1/60*

U.S. Cl. 430—197 5 Claims



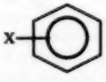
1. A photosensitive resin composition having a high sensitivity to ultra violet rays, a high resolution power, excellent oxygen reactive ion etching properties adapted for use for forming a pattern in a double layer resist system as a resist layer comprising:

(a) a substituted polyphenylsilsesquioxane represented by the following formula



(I)

wherein X is acryloyloxymethyl, or methacryloyloxymethyl, and l, m and n are zero or positive integers provided that l and m cannot both be zero; and wherein a substitution ratio by the substituent



of said substituted polyphenylsilsesquioxane ranges between 10 to 50%, and

(b) a bisazide compound selected from the group consisting of 2,6-di(4-azidobenzal)cyclohexanone, and 2,6-di(4-azidobenzal)4-methylcycloohexanone wherein said bisazide compound is present in an amount of from 0.5 to 30 wt % based on the weight of said substituted polyphenylsilsesquioxane.

4. The photosensitive resin composition according to claim 1, further comprising a sensitizer selected from the group consisting of aromatic carbonyl compounds, benzoin compounds, pigment redox compounds, azo-compounds, sulfur-containing compounds, organic peroxides, aromatic nitro-compounds, quinone compounds, anthrone compounds and acenaphthene compounds.

4,702,991

OPTICAL TYPE INFORMATION RECORDING MEDIUM AND MANUFACTURING METHOD THEREOF

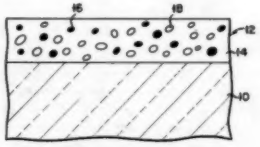
Yoshikatsu Takeoka; Norio Ozawa, both of Kawasaki, and Nobuaki Yasuda, Zushi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 778,245, Sep. 20, 1985, abandoned. This application Jun. 20, 1986, Ser. No. 875,527

Claims priority, application Japan, Oct. 30, 1984, 59-228506; Feb. 4, 1985, 60-18689; Feb. 4, 1985, 60-18690

Int. Cl.[4] G03C *1/72, 1/74;* G01D *9/00;* B32B *7/00*

U.S. Cl. 430—270 20 Claims



1. A recording medium comprising:

a substrate; and

a recording layer for absorbing radiation energy when radiation is incident thereon such that an intensity of the radiation is changed in accordance with recording information, and for producing a gas component in accordance with a radiation energy level so as to form a local projection to thereby form a protuberance corresponding to the radiation energy level, said recording layer comprising a mixture of a heat-resistant insulative material, metal clusters which absorb the radiation energy and are heated, and organic clusters for producing the gas component upon heating of said metal clusters, causing said insulative material to locally project and form said protuberance on said recording layer.

4,702,992

METHOD OF PREPARING PHOTORESIST MATERIAL WITH UNDERCOATING OF PHOTOEXTINCTION AGENT AND CONDENSATION PRODUCT

Wataru Ishii, Hadano; Shozo Miyazawa, Chigasaki; Shinji Tsuchiya, Kanagawa; Hisashi Nakane, Kawasaki, and Akira Yokota, Yamato, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kanagawa, Japan

Filed Mar. 6, 1985, Ser. No. 708,940

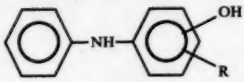
Claims priority, application Japan, Mar. 6, 1984, 59-41231

Int. Cl.[4] G03C *1/76, 1/74*

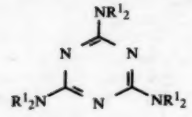
U.S. Cl. 430—272 7 Claims

1. A method for the preparation of a photoresist comprising a silicon substrate having on one surface thereof a first undercoating layer and, on the undercoating layer a second topcat photoresist layer, said method comprising the steps of:

1. coating the substrate with a first undercoating layer containing at least 1% by weight of a photoextinctive agent having absorptivity to light in the wave length region where the photosensitive resist in the second topcat photoresist layer has sensitivity to light, and a condensation product formed by a condensation reaction in the presence of an acid between a hydroxydiphenylamine compound represented by the formula



in which R is a hydrogen atom or a hydroxyl group and a melamine compound of the formula



in which R^1 is selected from the group consisting of a hydrogen atom, methylol and alkoxymethyl groups, at least one of the groups being methylol or alkoxymethyl, an alkoxy group containing from 1 to 4 carbon atoms, and

2. thereafter coating topcoat layer of photoresist without destroying the integrity of the undercoating layer; provided that, the amount of melamine compound is from 1% to 60% by weight based on the total weight of the hydroxydiphenylamine compound and the melamine compound, and that the photoextinctive agent absorbs light in the wave length region in which the photosensitive resist of the topcoat layer is sensitive to light.

4,702,993

TREATMENT OF PLANARIZING LAYER IN MULTILAYER ELECTRON BEAM RESIST

Lawrence K. White, Princeton Jct., and Richard Brown, Berkeley Hights, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Nov. 25, 1985, Ser. No. 802,020

Int. Cl.[4] G03C *5/00*; G03F *7/26*

U.S. Cl. 430—296 **9 Claims**

1. A process of forming a patterned electron beam resist structure on a substrate comprising:

(a) coating the substrate with a layer of organic planarizing material;

(b) treating the planarizing layer with an ion beam for a time sufficient to render it conductive;

(c) coating the conductive planarizing layer with a layer of electron beam resist;

(d) pattern irradiating the resist layer with an electron beam;

(e) developing the resist layer; and

(f) developing the underlying portion of the planarizing layer thereby exposing a portion of the substrate.

4,702,994

PROJECTION IMAGED RELIEF PRINTING PLATES

Francis J. Rendulic, Sudbury; Randolph H. Robinson, Dover, and John A. Maccini, Wellesley, all of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.

Continuation of Ser. No. 656,302, Oct. 1, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 873,459

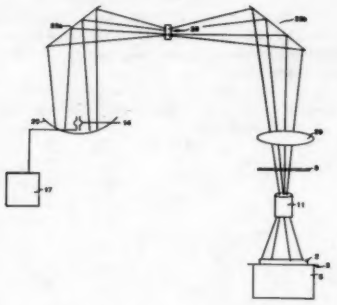
Int. Cl.[4] G03F *7/10, 7/20*

U.S. Cl. 430—306 **23 Claims**

1. A method for making a relief printing plate comprising the steps of:

(a) providing a layer of photopolymer composition on a support sheet;

(b) exposing the photopolymer layer to image forming projected light radiation provided by passing light radiation, which has been passed first to homogenizing means and then condensing means, through image bearing means out of contact with said photopolymer layer to a projection enlargement means which projects the resultant image upon the photopolymer layer at a predetermined ratio of enlargement greater than 1:1; and



(c) developing the relief printing plate by removing from the support sheet portions of photopolymer composition which were unexposed during the image exposure step b.

4,702,995

METHOD OF X-RAY LITHOGRAPHY

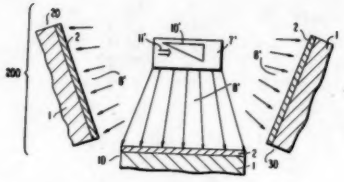
Koichi Okada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,054

Claims priority, application Japan, Aug. 24, 1984, 59-176221; Aug. 24, 1984, 59-176222; Aug. 24, 1984, 59-176223; Sep. 6, 1984, 59-186832

Int. Cl.[4] G03C *5/00, 5/04*

U.S. Cl. 430—311 **17 Claims**



1. A method of litography comprising steps of:

preparing a workpiece having a substrate and a resist layer formed on said substrate, said resist layer having a sensitivity to an electromagnetic wave such that an image is formed by irradiating said wave at selected parts of said resist layer in an amount of irradiation that is greater than a predetermined value and developing said resist layer,

selectively irradiating a first section of said resist layer by said wave in an amount of irradiation that is less than said predetermined value, whereby a first portion in said first section of said resist layer is substantially irradiated but the amount of said selective irradiation is smaller than said predetermined value and a second portion in said first section of said resist layer, other than said first portion, is not substantially irradiated,

repeating the same selective irradiation at other sections of said resist layer, and

subsequently uniformly irradiating said entire resist layer by said wave to an extent that the accumulated amount of irradiation on said respective first portions, before developing said resist layer, is above said predetermined value and the accumulated amount of irradiation on said respective second portions is below said predetermined value.

4,702,996

METHOD OF ENHANCING THE CONTRAST OF IMAGES AND MATERIALS THEREFOR

Bruce F. Griffing, Schenectady, and Paul R. West, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 536,923, Sep. 28, 1983, abandoned, which is a continuation-in-part of Ser. No. 438,194, Nov. 1, 1982, abandoned. This application May 17, 1985, Ser. No. 735,016

Int. Cl.[4] G03C 5/00

U.S. Cl. 430—325 12 Claims

1. A method of producing in a layer of photoresist having a predetermined contrast threshold a pattern representing an enhancement in contrast of a projected image of an object with opaque and transparent regions having a contrast less than said predetermined contrast threshold when light of a predetermined wavelength to which said layer of photoresist is sensitive is utilized to form said projected image of said object, comprising

providing said layer of photoresist having a first thickness,

providing said object,

providing between said object and said layer of photoresist and adjacent a surface of said layer of photoresist a layer of photobleachable material of a second thickness including a photobleachable compound selected from the aryl nitrone class of compounds,

said photobleachable compound being sensitive to said predetermined wavelength of light, said photobleachable compound having an extinction coefficient to molecular weight ratio in the unbleached state greater than about 10 liters per gram-cm, the ratio of the extinction coefficient for the unbleached state to the extinction coefficient for the bleached state of said photobleachable compound being greater than about 10,

said layer of photobleachable material having the characteristic that when light of said predetermined wavelength is projected through said object onto said layer of photobleachable material the optical density of said layer of photobleachable material is reduced in direct proportion to the dosage of light of said predetermined wavelength incident thereon, whereby the integrated contrast of the image of said object transmitted by said layer of photobleachable material increases with dosage of light transmitted thereby, reaches a maximum value and thereafter decreases, said maximum value of integrated contrast being greater than said perdetermined contrast threshold,

said first thickness and sensitivity of said layer of photoresist being selected such that said layer of photoresist is fully exposed by a dosage of light in a predetermined range transmitted by said layer of photobleachable material and produces an integrated contrast in the transmitted image greater than said predetermined contrast threshold,

projecting light of said predetermined wavelength through said object for a time to provide said dosage in said predetermined range transmitted through said layer of photobleachable material,

removing said layer of photobleachable material and developing said layer of photoresist,

whereby said pattern representing said enhancement in contrast of said image of said object is produced in said layer of photoresist.

4,702,997

PHOTOPOLYMERIZABLE LAMINATE

Hideo Ai; Akihiko Ideda, and Jiro Sato, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 604,809, Apr. 27, 1984, abandoned. This application Feb. 6, 1986, Ser. No. 826,712

Claims priority, application Japan, May 9, 1983, 58-80445

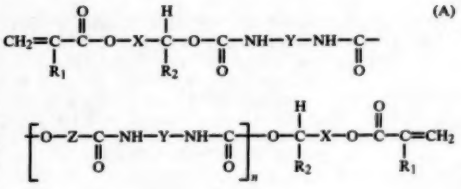
Int. Cl.[4] G03C 5/16, 1/70

U.S. Cl. 430—325 3 Claims

1. In the formation of a resist image by exposing selected areas of a laminate including a photopolymerizable layer to actinic light, dissolving away the areas which were not exposed to the light and leaving the areas exposed to the light, the dissolution being effected with an organic solvent, the improvement which comprises employing as the laminate a photopolymerizable laminate consisting essentially of a photopolymerizable layer and a support layer, said photopolymerizable layer containing:

(1) 5 to 95% by weight, based on the total weight of the photopolymerizable layer, of a binder comprising a vinyl polymer or a vinyl copolymer,

(2) 95 to 5% by weight, based on the total weight of the photopolymerizable layer, of a monomeric component containing at least 50% by weight of at least one compound selected from the group consisting of the photopolymerizable unsaturated compounds represented by the formula (A) shown below and having a value of molecular weight/number of double bonds contained of 1000 or less,



wherein

n is an interger of 0 or more;

R_1 is hydrogen or methyl;

X is a divalent C_{1-8} aliphatic hydrocarbon group,

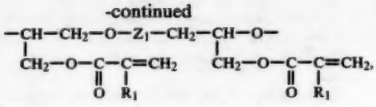
(where R_3 is a C_{1-4} alkyl group, p is an integer of 1 to 10, q and r are each an integer of 1 to 4);

R_2 is a C_{1-6} alkyl group or CH_2—O—R_4 (where R_4 is phenyl, an aryl group or a C_{1-6} alkyl group);

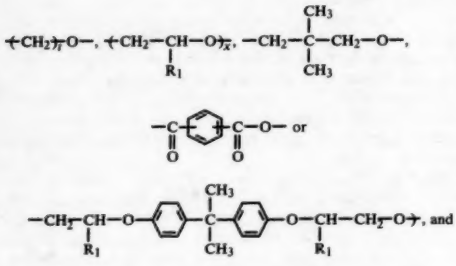
Y is a hexamethylene group;

Z is

-continued



(where t is an integer of 2 to 10, x is an integer of 1 to 30, Z_1 is



(3) 0.01 to 30% by weight, based on the total weight of the photopolymerizable layer, of a photopolymerization initiator.

4,702,998

PROCESSING SOLUTION FOR LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL COMPRISES METAL COMPLEXES OF LARGE POLYAMINE DERIVATIVES

M. Tanaka, Nagoya; Kazuhiro Kobayashi, and Shigeharu Koboshi, both of Tokyo, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,181

Claims priority, application Japan, Mar. 30, 1985, 60-67844

Int. Cl.[4] G03C *5/44, 7/30*

U.S. Cl. 430—430 **14 Claims**

1. A processing solution having bleaching ability for use in processing light-sensitive silver halide color photographic material, which comprises a color developing agent and an effective amount of at least one bleaching agent selected from the group consisting of metal complexes of large cyclic polyamine derivatives with the sum of the atoms for forming the ring being at least nine.

4,702,999

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS

Minoru Ohashi, and Satoshi Kaneko, both of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

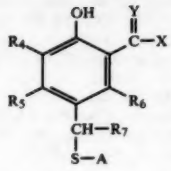
Filed Feb. 24, 1986, Ser. No. 832,422

Claims priority, application Japan, Feb. 25, 1985, 60-37270; Feb. 25, 1985, 60-37271

Int. Cl.[4] G03C *1/34*

U.S. Cl. 430—445 **7 Claims**

1. A silver halide photographic light-sensitive material which comprises a support and at least one photographic layer coated thereon, wherein at least one of silver halide emulsion layer and/or water-permeable contiguous colloid layer contain at least one development fog inhibiting compound represented by the following general formula (I) or (II):

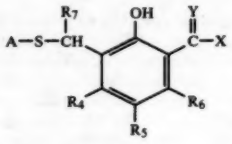


(I)

wherein Y represents oxygen atom or

X represents OR_3 when Y is oxygen atom and R_3 when Y is

where R_1 and R_2 each represent hydrogen atom, alkyl group or aryl group and R_3 represents hydrogen atom, alkyl group or phenyl group; R_4, R_5 and R_6 each represent hydrogen atom, halogen atom, alkyl group, carboxyl group, alkoxycarbonyl group or phenyl group, R_4 and R_5 may form together a benzene ring; R_7 represents hydrogen atom, alkyl group or phenyl group and A represents a heterocyclic group of mercapto antifoggant;



(II)

wherein, X, Y, R_4, R_5, R_6 and R_7 and A are the same as defined for general formula (I) and R_4 and R_5 or R_5 and R_6 may form together a benzene ring.

4,703,000

ANTI-BRICK/ANTI-STATIC COMPOSITIONS USEFUL FOR TREATING FILM SURFACES AND FILMS COATED THEREWITH

George R. Hodgins, South Hadley, Mass., assignor to James River Graphics, Inc., South Hadley, Mass.

Filed Sep. 30, 1985, Ser. No. 781,704

Int. Cl.[4] G03C *1/82, 11/00*

U.S. Cl. 430—493 **13 Claims**

1. An anti-brick/anti-static composition useful for treating film surfaces, comprising

(i) a surfactant having anti-static properties, which is a quaternary ammonium salt of N,N dimethyl, N-(2-hydroxyethyl)stearamidopropylamine, and

(ii) a similar charged inorganic particle having an average particle size less than 0.1 micron.

4,703,001

IMMUNOASSAY FOR THE DETECTION OF SERUM ANALYTES USING PH DEPENDENT CHASTROPIC ACIDS

Morton A. Vodian, Escondido, and Eric S. Bean, San Diego, both of Calif., assignors to Synbiotics, Corporation, San Diego, Calif.

Filed Oct. 23, 1985, Ser. No. 790,469
Int. Cl.[4] C12Q *1/70*; G01N *33/53, 33/564*
U.S. Cl. 435—5 15 Claims

1. An improved immunoassay for assaying an analyte within a serum sample, the analyte being antigenic, acid stable, and potentially bound by serum antibody, the improved immunoassay comprising the following steps:

step (1): dissociating the analyte from the serum antibody and denaturing the serum antibody by contacting the serum sample with an activated chaotrope at acid pH without the application of elevated heat, the chaotrope being of the type which is activated at room temperature by acid pH and which is de-activated by neutral pH, then

step (2): de-activating the chaotrope by neutralizing the pH of the serum sample, and then

step (3): performing an immunoassay on the serum sample for assaying the dissociated analyte in the presence of the denatured serum antibody, the immunoassay being of the type which is operable in the presence of de-activated chaotrope.

4,703,002

METHOD FOR PREPARING COATING COMPOSITIONS CONTAINING AN IMMUNOLOGICALLY REACTIVE SPECIES AND ELEMENTS CONTAINING SAME

John B. Findlay, Rochester, and Annie L. Wu, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 1, 1985, Ser. No. 729,332
Int. Cl.[4] G01N *33/543, 33/545, 33/548, 33/549*
U.S. Cl. 435—17 20 Claims

1. A method for preparing a blush polymer coating composition containing an active antibody or anti-antibody, said method comprising milling a dehydrated antibody or anti-antibody, a particulate material and a polymeric binder material in an organic solvent for a time sufficient to uniformly disperse said antibody or anti-antibody as particles less than about 5 μm in diameter in said binder material.

4,703,003

MONOCLONAL ANTIBODY WITH A HIGH AFFINITY FOR DIGOXIN

Carl-Julius Struck, Wiesbaden, Fed. Rep. of Germany, assignor to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

Filed Aug. 13, 1984, Ser. No. 640,317
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1983, 3330160
Int. Cl.[4] C12P *21/00*; C12N *15/00, 5/00*; C12R *1/91*
U.S. Cl. 435—68 10 Claims

1. A hybridoma which produces monoclonal antibodies having a high affinity and selectivity for digoxin, a cross-reactivity of less than 1.3% with digitoxin and a cross-reactivity of less than 0.007% with spironolactone.

4,703,004

SYNTHESIS OF PROTEIN WITH AN IDENTIFICATION PEPTIDE

Thomas P. Hopp; Susan L. Bektesh; Paul J. Conlon, III, and Carl J. March, all of Seattle, Wash., assignors to Immunex Corporation, Seattle, Wash.

Filed Jan. 24, 1984, Ser. No. 573,825
Int. Cl.[4] C12P *21/00*; C12N *1/00, 15/00*; C07H *21/04*
U.S. Cl. 435—68 6 Claims

1. A DNA expression vector comprising DNA coding for a hybrid polypeptide comprising

(1) an identification peptide consisting of a hydrophilic antigenic N-terminal sequence of up to six amino acids comprising both hydrophilic and aromatic amino acids and including the sequence Asp-Tyr-Lys;

(2) a constituent polypeptide; and

(3) a linking sequence of amino acids interposed between the identification peptide and the constituent polypeptide, said sequence being cleavable by a sequence-specific proteolytic agent at a specific amino acid residue adjacent to the constituent polypeptide.

4,703,005

EXPRESSION VECTOR CARRYING A GENE CODING FOR A PHOSPHATE-BINDING PROTEIN, A METHOD FOR PREPARING THE SAME AND A METHOD FOR PREPARING THE SAME AND A METHOD FOR PRODUCING A POLYPEPTIDE USING THE SAME

Atsuo Nakata, Toyonaka, and Hideo Shinagawa, Minoo, both of Japan, assignors to The Research Foundation for Microbial Diseases of Osaka University, Osaka, Japan

Filed Jun. 6, 1983, Ser. No. 501,559
Claims priority, application Japan, Jun. 4, 1982, 57-96775
Int. Cl.[4] C12P *21/00, 19/34*; C12N *15/00, 1/00*
U.S. Cl. 435—68 7 Claims

1. An expression vector which consists essentially of a DNA fragment of a phoS gene of Enterobacteriaceae and a replicon selected from the group consisting of plasmids and bacteriophages, said DNA fragment being ligated to said replicon.

4,703,006

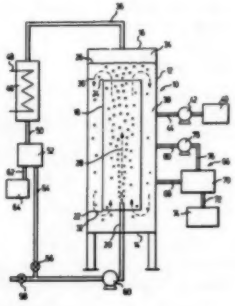
Patent Not Issued For This Number

4,703,007

SEPARATION OF VOLATILES FROM AQUEOUS SOLUTIONS BY GAS STRIPPING

D. Lindsay Mulholland, Puslinch, and John D. Sheppard, Montreal, both of Canada, assignors to Ontario Research Foundation, Mississauga, Canada

Filed Mar. 27, 1985, Ser. No. 716,398
Claims priority, application United Kingdom, Mar. 27, 1984, 8407828
Int. Cl.[4] C12M *1/04*
U.S. Cl. 435—161 16 Claims



1. A process for continuous removal of low concentrations of a volatile metabolite from a continuous culture of microor-

ganisms in a liquid media by passing a stripping gas through said liquid media, said process comprising containing said liquid media in an upright vessel, providing an upright tube in said vessel which has an open bottom and an open top, maintaining a liquid media level above said tube open top and below an outlet in an upper region of said vessel, culturing said microorganisms in said media on a continuous basis without cooling of said media thereby permitting culturing of said media at temperatures in excess of 30° C. to enhance production of said volatile metabolites, introducing in to said vessel nutrients to facilitate continuous culture of said microorgainisms, removing solids from said liquid media to control microorgainism population in said media during continuous culture, introducing said stripping gas into said tube open bottom whereby said stripping gas flows upwardly of said tube, said stripping gas being introduced at a gas flow rate substantially in excess of a normal gas flow rate used to induce circulation in said media, said upward flow of stripping gas also inducing circulation of said liquid media upwardly of said tube, out of said tube open top and downwardly of said vessel and returning to said tube open bottom, said gas stripping stream passing upwardly through said tube tube removing said volatile metabolite from said liquid media to become thereby enriched with said low concentration of volatile metabolite, said gas stripping stream enriched with said volatile metabolite exiting from said tube open top and emerging from said liquid media into said upper vessel region for collecting said enriched stripping gas, passing said enriched stripping gas out through a gas outlet in said vessel upper region and removing said volatile metabolite from said stripping gas.

4,703,008

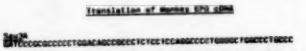
DNA SEQUENCES ENCODING ERYTHROPOIETIN

Fu-Kuen Lin, Thousand Oaks, Calif., assignor to Kiren-Amgen, Inc., Thousand Oaks, Calif.

Continuation-in-part of Ser. No. 561,024, Dec. 13, 1983, abandoned, and a continuation-in-part of Ser. No. 582,185, Feb. 21, 1984, abandoned, and a continuation-in-part of Ser. No. 655,841, Sep. 28, 1984. This application Nov. 30, 1984, Ser. No. 675,298

Int. Cl.[4] C12N *5/00, 15/00, 1/20, 1/00;* **C12Q** *1/68;* **C07H** *15/12*

U.S. Cl. 435—240.2 **31 Claims**



7. A purified and isolated DNA sequence consisting essentially of a DNA sequence encoding a polypeptide having an amino acid sequence sufficiently duplicative of that of erythropoietin to allow possession of the biological property of causing bone marrow cells to increase production of reticulocytes and red blood cells, and to increase hemoglobin synthesis or iron uptake.

4,703,009

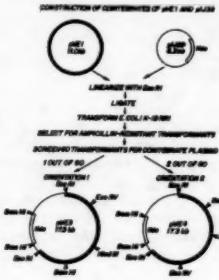
RDNA CLONING VECTOR PVE1, DELETION AND HYBRID MUTANTS AND RECOMBINANT DERIVATIVES THEREOF PRODUCTS AND PROCESSES

Tanya MacNeil, Westfield, and Patrice H. Gibbons, Edison, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 473,181, Mar. 8, 1983, abandoned. This application Dec. 4, 1985, Ser. No. 805,241

Int. Cl.[4] C12N *15/00, 1/00, 1/20;* **C12P** *19/34*

U.S. Cl. 435—172.3 **25 Claims**



1. An isolated vector consisting essentially of pVE1 plasmid.

4,703,010

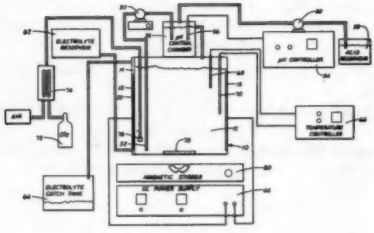
ELECTROLYTIC BIOREACTOR ASSEMBLY AND METHOD

Stanley B. Yunker, Danville, Pa., and John M. Radovich, Bend, Oreg., assignors to The Board of Regents for the University of Oklahoma, Norman, Okla.

Filed May 2, 1986, Ser. No. 859,007

Int. Cl.[4] C12N *13/00*

U.S. Cl. 435—173 **14 Claims**



1. An electrolytic bioreactor comprising:

a reaction vessel defining a cultivation chamber, adapted for containing a culture solution and a cathode, and an anode chamber disposed in fluid communication with the cultivation chamber, such anode chamber being adapted for containing an electrolyte solution and an anode;

means for mounting a selective barrier between the anode chamber and the cultivation chamber so that the selective barrier will separate the anode chamber from the cultivation chamber but will allow fluid communication therebetween; and

a receptacle defining a pH control chamber adapted for receiving samples of the culture solution from the cultivation chamber and connectable by a conduit to the cultivation chamber so that the solution samples within the pH control chamber are insulated from electric current through the cultivation chamber, and being further adapted to cooperate with a pH control system, whereby the pH of the culture solution is monitored and adjusted

within the pH control chamber to maintain the culture solution at a selected pH.

10. A method for growing chemolithotrophic organisms capable of oxidizing metal sulfides, comprising:

contacting the organisms with culture solution comprising metal sulfide substrate within a cultivation chamber of an electrolytic bioreactor assembly wherein a cathode is disposed within the cultivation chamber and wherein an anode is disposed within an anode chamber containing an electrolytic solution, such anode chamber being in fluid communication with the cultivation chamber and separated therefrom by a selective barrier characterized by being substantially impermeable to cations and to the organisms;

electrolyzing the culture solution and the organisms; and

maintaining the culture solution at a selected pH during electrolysis by circulating samples of the culture solution through a pH control chamber, so that the culture solution samples within the pH control chamber are insulated from electric current within the cultivaiton chamber, monitoring the pH of the culture solution samples in the pH control chamber, and adjusting the pH of culture solution samples in the pH control chamber in response to such monitoring.

4,703,011

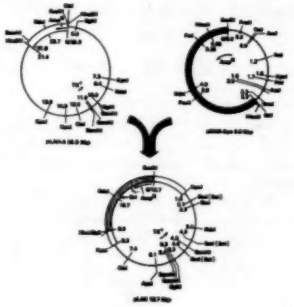
THYMIDINE KINASE DELETION MUTANTS OF BOVINE HERPESVIRUS-1

Malon Kit, and Saul Kit, both of Houston, Tex., assignors to NovaGene, Inc. and Baylor College of Medicine, both of Houston, Tex.

Filed Nov. 12, 1985, Ser. No. 796,840

Int. Cl.[4] C12N *7/04, 15/00;* **A61K** *39/12*

U.S. Cl. 435—236 **25 Claims**



1. An infectious bovine rhinotracheitis virus which fails to produce any functional TK as a result of a deletion in the tk gene.

4,703,012

HIGH COPY-NUMBER PLASMID VECTORS, PRODUCTION AND USE THEREOF

Imre Boros; Pal Venetianer, and György Posfai, all of Szeged, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar R.T., Budapest, Hungary

Filed Sep. 17, 1984, Ser. No. 651,679

Claims priority, application Hungary, Sep. 16, 1983, 3212/83

Int. Cl.[4] C12P *19/34;* **C12N** *15/00, 7/00, 1/20*

U.S. Cl. 435—320 **12 Claims**

1. A high copy number plasmid vector containing the pBR322 origin of replication and region flanking pBR322 bp 3074, said pBR322 origin of replication located between the restriction sites for EcoRI and PvuII endonucleases, and containing:

(a) a G→T point mutation at bp 3074, said G→T point mutation located in the region of pBR322 between bp 2978 and 3081 responsible for producing an RNA molecule which functions as a repressor of plasmid replication; and

(b) an ampicillin resistance gene as a selective genetical marker, in said plasmid vector the tetracycline resistance gene being entirely lacking.

4,703,013

UROBILINOGEN CONTROL

Allan L. Louderback, 9661 Longden Ave., Temple City, Calif. 91780, and Paul R. Szatkowski, 24 Winthrop Rd., Bethel, Conn. 06801

Division of Ser. No. 859,339, May 5, 1986, Pat. No. 4,677,075. This application Mar. 23, 1987, Ser. No. 29,526

Int. Cl.[4] G01N *31/00*

U.S. Cl. 436—12 **1 Claim**

1. The method of making a stable control solution for the determination of urobilinogen comprising converting bilirubin to urobilinogen with about 5.4% sodium amalgam in the presence of from about 2% to about 7% diethylamine, dissolving the resulting urobilinogen product at a concentration of from about 40 to about 400 mg/dl urobilinogen in aqueous ethylene glycol at a concentration of from about 3% to about 12% ethylene glycol, adding about 0.1% protein and adjusting the pH to a level of from about 8.0 to about 9.0.

4,703,014

KARL-FISCHER REAGENT AND PROCESS FOR THE DETERMINATION OF WATER

Wolfgang Fischer, Darmstadt, and Karl-Dieter Krenn, Pfungstadt, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Feb. 27, 1985, Ser. No. 706,225

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1984, 3407014

Int. Cl.[4] G01N *33/18*

U.S. Cl. 436—42 **12 Claims**

1. In a Karl-Fischer reagent useful for the determination of water, comprising a solution containing a pyridine substitute, sulfur dioxide and iodine, the improvement wherein the pyridine substitute is at least one compound which is a salt of a mono-, di-, tri-, or tetra-alkyl C_1-6 guanidine derivative or guanidine with benzoic acid or a 2-C_1-6-alkyl- or 2,6-di-C_1-6-alkyl benzoic acid, said pyridine substitute being functionally equivalent to pyridine in a Karl-Fischer reagent.

4,703,015

METHOD AND REACTIVE COMPOSITION SUITABLE FOR THE COLORIMETRIC DETERMINATION OF METALS

Alessandro Tabacco; Edoardo Moda, both of Siena, and Paolo Tarli, Monteriggioni, all of Italy, assignors to Sclavo, S.p.A., Siena, Italy

Continuation of Ser. No. 640,953, Aug. 15, 1984, abandoned. This application Sep. 5, 1986, Ser. No. 904,751

Claims priority, application Italy, Sep. 28, 1983, 23028 A/83

Int. Cl.[4] G01N *33/48, 33/52*

U.S. Cl. 436—74 **3 Claims**

1. Method for the determination of iron in biological fluids which comprises the following steps:

(1) adding to a biological fluid a colormetric reagent consisting of a buffer at acidic pH, an organic and/or inorganic salt of an alkali or alkaline earth metal, Chromazurol S in acidic form and a cationic or non ionic surfactant;

(ii) incubating the product of (i) at a temperature variable between 0° C. and 50° C.; and

(iii) reading the optical density at a determined wave length against a solution of a blank chromogenic reagent.

3. A kit for the determination of serum iron, said kit comprising a colorimetric reagent suitable to the determination of iron in biological fluids, said reagent consisting of two solutions, in which the first solution consists of a buffer at an acidic pH, a magnesium halogenide, Chromazurael S in acidic form, and cetyltrimethyl ammonium bromide, the second solution containing a complexing agent able to inhibit the formation of a complex between Chromazurol S in acidic form, the cetyltrimethylam-monium bromide and the iron, alone or with the other components of the first solution.

4,703,016

SILVER STAIN FOR RAPID, QUANTITATIVE DETECTION OF POLYPEPTIDES AND NUCLEIC ACIDS

Carl R. Merril, Rockville, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed May 5, 1986, Ser. No. 859,822
Int. Cl.[4] G01N *21/77, 33/52, 33/58*
U.S. Cl. 436—86 5 Claims

1. A staining system consisting essentially of separate aqueous solutions in distilled or deionized water of:

(a) cupric acetate up to saturating concentration;

(b) about 10–50% v/v acetic acid comprising about 0.01 to 0.1M NaCl and about 0.01 to 0.2M citric acid;

(c) about 10–50% v/v acetic acid comprising about 0.01–0.5M $AgNO_3$;

(d) about 0.01–0.3M hydroquinone comprising about 0.1% to 10% v/v of a concentrated formaldehyde stock solution; and

(e) about 0.01 to 0.5M $Na_2S_2O_3$; whereby a positive image stain of electrophoretically separated proteins or nucleic acids fixed on an electrophoretic separation medium is formed when such proteins or nucleic acids are treated with the staining system in a predetermined manner.

2. A method of staining separated proteins or nucleic acids fixed on a separation medium to produce a positive image thereof, comprising the steps of:

(a) placing a separation medium containing fixed protein or nucleic acid samples in a solution of about 0.1 to 0.4M cupric acetate for about one minute;

(b) then transferring the separation medium from step (a) to a solution of about 10% v/v acetic acid containing about 0.03M NaCl and about 0.1M citric acid for about one minute;

(c) then transferring the separation medium to a solution of about 10% v/v acetic acid containing about 0.1M $AgNO_3$ and irradiating the separation medium for about one minute with uniform light;

(d) then removing the separation medium from the silver nitrate solution of step (c) and again placing the separation medium in the solution of step (b) for about one minute;

(e) then transferring the separation medium back to the silver nitrate solution of step (c) and irradiating the separation medium for about three minutes with uniform light;

(f) then tranferring the separation medium of step (e) into a solution of about 0.2M hydroquinone containing about 4% v/v of a concentrated formaldehyde stock solution, for about one minute, or until the proteins or nucleic acids in the separation medium develop an even dark brown color;

(g) then rinsing the separation medium for about one minute with water, and thereafter immersing the separation medium for about five minutes in a basic solution containing about 0.06M $Na_2S_2O_3$ while gently agitating the separation medium every 30 seconds;

(h) then washing the separation medium with a stream of tap water flowing parallel to a surface thereof to wash off unbound silver.

4,703,017

SOLID PHASE ASSAY WITH VISUAL READOUT

Robert L. Campbell, Durham; Daniel B. Wagner, Raleigh, and James P. O'Connell, Chapel Hill, all of N.C., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.

Filed Feb. 14, 1984, Ser. No. 579,667
Int. Cl.[4] G01N *33/532, 33/543, 33/544, 33/548*
U.S. Cl. 436—501 62 Claims

1. A process for assaying for an analyte, comprising:

contacting a binder supported on a test area of a solid with a solution of analyte and a tracer, said binder being a binder for at least the analyte, said tracer being comprised of a ligand labeled with a visible particulate label wherein when said particulate label is a sac including a visable dye, said sac is selected from the group consisting of liposomes and microcapsules, said ligand being bound to one of the binder and analyte whereby the tracer is bound to one of the binder on the support and the analyte bound to the binder on the support, said test area being formed of a material having a surface area for supporting the binder and the binder being supported in a concentration whereby bound tracer is visible on the support under assay conditions, said binder being supported in a concentration of at least 1 $\mu g/cm^2$; and

determining the visibility of tracer bound in said test area as a measure of analyte in a sample.

4,703,018

HIGH REFRACTIVE INDEX HALOALKYL-FUNCTIONAL SHELL-CORE POLYMERS AND THEIR USE IN LIGHT SCATTERING IMMUNOASSAYS

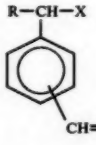
Alan R. Craig, and Eileen G. Gorman, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 20, 1985, Ser. No. 703,424
Int. Cl.[4] G01N *33/543*
U.S. Cl. 436—518 10 Claims

1. A particle reagent having high refractive index consisting essentially of:

(A) a polymer particle having an inner core and an outer shell wherein the inner core is a polymer having a refractive index of not less than 1.54 as measured at the wavelength of the sodium D line and wherein the outer shell is a polymer of

(1) five to about seventy parts by weight of the outer shell of an ethylenically unsaturated monomer having a haloalkyl functional group capable of reacting with a compound of biological interest, its antigen or its antibody, selected from the group consisting of



wherein X is Cl or Br and R is H, CH_3, or C_2H_5,

(2) 95 to about 30 parts by weight of other ethylenically unsaturated monomers selected in amounts not to result in the formation of water soluble polymer particles, and

(3) not more than 10 parts by weight of the outer shell of the residual monomers of the inner core;

said outer shell being formed by polymerization in the presence of said inner core; and wherein said polymer particle has an approximate diameter range of 0.01–1.0 μm, a 5–100% surface coverage by a monomolecular layer of anionic surfactant, and is covalently attached to

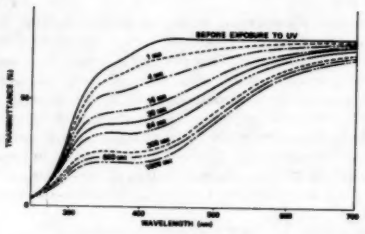
(B) a compound of biological interest, its antigen or its antibody.

4,703,019

GLASS USEFUL AS EITHER PHOTOSENSITIVE GLASS OR OPALINE FOAM GLASS

Yoshihiro Abe, and Hideo Hosono, both of Aichi, Japan, assignors to Central Glass Company, Limited, Ube, Japan, a part interest

Filed May 9, 1986, Ser. No. 861,269
Claims priority, application Japan, May 20, 1985, 60-105973
Int. Cl.[4] C03C *4/02, 4/04*
U.S. Cl. 501—13 10 Claims



1. A glass member formed of a glass composition which consists essentially of 25–70 mol % of a first component which is at least one oxide selected from the group consisting of Al_2O_3 and Ga_2O_3, 30–75 mol % of a second component which is at least one alkaline earth metal oxide selected from the group consisting of CaO, BaO, SrO and MgO and 0–40 mol % of an auxiliary component which is at least one oxide selected from the group consisting of SiO_2, GeO_2, B_2O_5 and P_2O_5, wherein said glass member is approximately a yellowish brown color in at least a selected region thereof, said color being produced by irradiating said selected region of said glass member with ultraviolet rays.

4,703,020

PROCESS FOR THE PRODUCTION OF JEWELLING AND ORNAMENTAL MATERIAL

Yuji Nakano, Kameoka; Kazushi Kamiyama, and Tatuo Kobayashi, both of Kyoto, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Division of Ser. No. 664,710, Oct. 25, 1984, Pat. No. 4,608,307.
This application Mar. 26, 1986, Ser. No. 824,093
Claims priority, application Japan, Oct. 26, 1983, 58-201345
Int. Cl.[4] C30B *28/00*
U.S. Cl. 501—86 29 Claims

1. A process for producing a jewelling and ornamental material, which comprises:

producing a structure composed of regularly three-dimensionally arranged amorphous silica spheres by subjecting a mixture of uniform amorphous silica spheres having a particle diameter within the range of from about 0.15 μm to about 0.4 μm, with water to a sedimentation operation and then to drying and calcining operations, said calcining operation occurring at a temperature within the range of from 700° to 900° C.,

impregnating the three-dimensionally arranged structure with a solution of a zirconium alkoxide so that the amount of zirconium based on the entire structure becomes 0.005 to 8% by weight, hydrolyzing the zirconium alkoxide to zirconium ozide or hydroxide and precipitating it in the pores of the structure, and

calcining the resulting structure at a temperature of from 1,000° to 1,300° C.

4,703,021

SLIDING CONTACT TYPE CERAMICS ARTICLE AND A METHOD FOR MANUFACTURING THE SAME

Kazuyuki Yasuda, Tokyo, and Sigeo Suzuki, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 24, 1984, Ser. No. 653,771
Claims priority, application Japan, Sep. 26, 1983, 58-177372
Int. Cl.[4] C04B *35/52*
U.S. Cl. 501—87 8 Claims

1. A ceramics article, comprising a ceramics compact body, in which at least a part of said ceramics compact body which is adapted to be in sliding contact with an associated article has a density greater than that of the rest of said ceramics compact body.

4,703,022

ALUMINA AND MGO PREHEATABLE INSULATING REFRACTORY LINERS AND METHODS OF USE THEREOF

Howard B. Johnson, Cincinnati, Ohio, assignor to Consolidated Ceramic Products, Inc., Blanchester, Ohio

Filed Oct. 30, 1984, Ser. No. 666,510
Int. Cl.[4] C04B *35/04, 35/10*
U.S. Cl. 501—95 21 Claims

1. A preheatable molded refractory insulating liner structure prior to preheating of predetermined shape having insulating porosity for a metal casting vessel suitable for developing sufficient hot strength to maintain the integrity of the structure at vessel preheat and molten metal casting temperatures which are in the range of about 1900° F. to about 3000° F. comprising

a molded uniform mixture having a substantial insulating porosity on the order of about 50% prior to preheating containing a particulate refractory component in an amount of about 75% to about 98.5% by weight of said preheatable liner structure of a mixture of alumina and MgO refractory grain wherein said alumina and MgO refractory grain are in a ratio of about 1:1 to about 1:94, respectively, and

a binder for said component and inorganic fibrous material in sufficient amounts to maintain the predetermined shape of insulating porosity at least prior to the preheat temperatures wherein said alumina and MgO refractory grain are of a particle size in said preheatable liner structure to facilitate the formation of spinel bonding which results in increased hot strength with substantial maintenance of insulating porosity and shape without substantial shrinkage at both the vessel preheat temperatures of about 1900° F. to about 2400° F. and higher metal casting temperatures when said preheatable liner structure is used in a casting vessel heated for a sufficient period of time.

4,703,023

PROCESS FOR THE PRODUCTION OF LOW-THERMAL-EXPANSIVE $(ZRO)_2 P_2O_7$ CERAMIC

Iwao Yamai, Nagoya, Japan, assignor to Nihon Ceramics Co., Ltd., Toki, Japan

Filed Mar. 24, 1986, Ser. No. 843,077
Claims priority, application Japan, Mar. 22, 1985, 60-59052
Int. Cl.[4] C04B *35/48*
U.S. Cl. 501—102 5 Claims

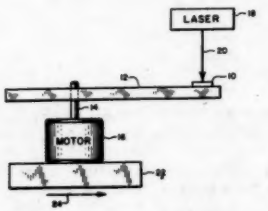
1. A process for the production of low-thermal-expansive $(ZrO)_2.P_2O_7$ polycrystalline ceramic which comprises sintering the fine-powder compact of $(ZrO)_2.P_2O_7$ crystal with a densifying aid selected from the group consisting of zinc oxide, magnesium oxide, bismuth oxide, manganese oxide, iron oxide, cobalt oxide, nickel oxide, the compounds of said metal oxides and mixtures thereof together with a grain-growth-suppressing aid selected from the group of consisting silicon dioxide, metal silicate and mixtures thereof at a temperature from 1200° C. to 1700° C. wherein the content of the densifying aid is from 0.2% to 10.0% by weight and the content of the grain-growth-suppressing aid is from 0 to 10% by weight.

4,703,024

METHODS FOR IMPROVING MECHANICAL PROPERTIES OF PARTIALLY STABILIZED ZIRCONIA AND THE RESULTING PRODUCT

Victor A. Aronov, 8620 Waukegan Rd., Morton Grove, Ill. 60053

Filed Feb. 26, 1986, Ser. No. 833,817
Int. Cl.[4] C04B *35/48*
U.S. Cl. 501—103 25 Claims



1. A method for improving mechanical surface properties of a rigid body comprising partially stabilized zirconia as a constituent, said method comprising the following steps:

(i) providing a rigid body having an exposed surface and an interior volume, said surface including at least one exposed surface region of partially stabilized zirconia;

(ii) subjecting the exposed surface region of partially stabilized zirconia to external heating to heat the exposed surface region to 1100° C.–1600° C. without heating the interior volume above 500° C.–800° C.; and

(iii) cooling said rigid body to a temperature of less than 500° C. to cause a portion of the exposed surface region to transform from the tetragonal lattice modification to the monoclinic lattice modification, thereby creating a compressive stress field in the exposed surface region and improving the mechanical surface properties of the exposed surface region.

17. In a ceramic body comprising a first exposed region of a partially stabilized zirconia, and a second region of a partially stabilized zirconia at an interior portion of the ceramic body, the improvement comprising said ceramic body

having in the first, exposed region a greater percentage of the monoclinic lattice modification than in the second region;

having in the first, exposed region 5 percent to 100 percent in the monoclinic lattice modification; and

having a molded surface finish in the first, exposed region;

said first, exposed region being subjected to a compressive field resulting from the greater percentage of the monoclinic lattice modification.

4,703,025

METHOD FOR PURIFYING ZEOLITIC MATERIAL

George T. Kokotailo, Woodbury, and Albert C. Rohrman, Jr., Gibbstown, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 774,515, Sep. 10, 1985, abandoned. This application Feb. 24, 1987, Ser. No. 16,449
Int. Cl.[4] B01J *29/06*; C10B *33/28*
U.S. Cl. 502—60 19 Claims

1. A method for purifying an impure zeolitic material which contains a plurality of crystalline zeolite phases of varying solubility in the presence of hydroxide ion whereby crystalline phases of greater solubility are removed from said zeolitic material which comprises contacting said zeolitic material with an aqueous solution having a hydroxide ion concentration sufficient to substantially solubilize at least one but not all of said phases in such a way that said solution does not substantially enter the zeolitic channel system of said material, and thereafter washing said zeolitic material to remove said solubilized phases.

9. The method of claim 1 wherein said solution is a 1 to 50 weight percent aqueous solution of alkali metal hydroxide.

15. The method of claim 1 wherein said impure zeolitic material contains a component selected from the group consisting of zeolite beta, ZSM-5, ZSM-11, ZSM-5/ZSM-11 intermediate, ZSM-12, ZSM-23, ZSM-35, ZSM-38 and ZSM-48.

4,703,026

CATALYST COMPONENT FOR POLYMERIZATION OF OLEFINS

Mitsuyuki Matsuura, and Takashi Fujita, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Jun. 11, 1986, Ser. No. 872,832
Claims priority, application Japan, Jun. 11, 1985, 60-126943; Jun. 11, 1985, 60-126945
Int. Cl.[4] C08F *4/64*
U.S. Cl. 502—119 25 Claims

1. A catalyst component for the polymerization of an olefin, which consist essentially of:

a contact product of (A) a solid composition obtained by mixing a precipitating agent with a solution of a contact product of a magnesium dihalide and a titanium tetraalkoxide and/or a polymer thereof, the addition of the precipitating agent being conducted with stirring at a stirring intensity ranging from nf/15 to 2nf, wherein nf is the flotation limit stirring intensity of the reaction medium, with (B) a liquid titanium compound and/or halogen compound of silicon.

4,703,027

MOLYBDENUM/ALKALI METAL/ETHYLENE GLYCOL COMPLEXES USEFUL AS EPOXIDATION CATALYSTS

Edward T. Marquis, Austin; John R. Sanderson, Leander, and Kenneth P. Keating, Georgetown, all of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 6, 1986, Ser. No. 916,076
Int. Cl.[4] B01J *31/22*
U.S. Cl. 502—171 16 Claims

1. A clear, storage stable solution of a molybdenum/alkali metal/ethylene glycol complex in ethylene glycol made by the process comprising:

reacting at an elevated temperature between about 25° and 150° C. a solid ammonium molybdate or a hydrate thereof and a solid alkali metal molybdate or a hydrate thereof with ethylene glycol, such that the ratio of moles of ethylene glycol to total gram atoms of molybdenum in said molybdates ranges from about 7:1 to 10:1, and the ratio of gram atoms of molybdenum in said ammonium molybdate

or hydrate thereof to gram atoms of molybdenum in said alkali metal molybdate is from about 1:1 to about 20:1 to thereby provide a reaction product composed of a solution of an alkali metal-containing complex of molybdenum, alkali metal and ethylene glycol and by-products, including water, in said ethylene glycol and

subsequently stripping said solution at a reduced pressure to remove from about 5 to about 25% of said reaction product, as distillate, to thereby provide a storage stable solution of said complex in said ethylene glycol having a molybdenum content of about 6 wt. % to about 20 wt. %, a water concentration of about 0.1 wt. % to about 6 wt. % and an acid number of more than about 60.

4,703,028

CARRIER FOR THE MANUFACTURE OF ABRASION-RESISTANT CATALYSTS, PROCESS FOR THE PRODUCTION OF THE CARRIER AND CATALYST DEPOSITED ON THE CARRIER

Helmut Steininger, Neu-Anspach, Fed. Rep. of Germany, assignor to Battelle - Institut e.V., Frankfurt, Fed. Rep. of Germany

PCT No. PCT/EP84/00394, § 371 Date Aug. 6, 1985, § 102(e) Date Aug. 6, 1985, PCT Pub. No. WO85/02557, PCT Pub. Date Jun. 20, 1985

PCT Filed Dec. 8, 1984, Ser. No. 763,436

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1985, 3344343

Int. Cl.[4] B01J *21/02, 21/04, 21/06*

U.S. Cl. 502—178 **15 Claims**

1. An abrasion-resistant catalyst comprising an inert carrier provided with a surface coating of a high fusion oxide, nitride and/or carbide of at least one transition metal, boron, aluminum and/or silicon or combinations of these compounds, said surface coating being deposited by means of physical vapor deposition techniques and serving as an intermediate coating for the subsequent deposition of a catalytic material, said intermediate coating being composed of a plurality of individual elevated structures having a height of from 0.5 to 20 μm, said structures defining spaces disposed therebetween, and said spaces being completely filled with a catalytic material and structures being covered with said catalytic material whereby said structures act as adhesive-promoting, interlocking members of said catalytic material, and wherein prior to said surface coating being deposited, the inert carrier had been heated to a temperature of approximately 0.3 to 0.4 times the melting point of the surface coating.

4,703,029

MOLDINGS MADE OF SILICATE MATERIAL AND PROCESSES FOR THEIR PREPARATION

Hans-Peter Rieck, Hofheim am Taunus; Martin Schott, Steinbach/Taunus, and Jürgen Russow, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Jul. 16, 1985, Ser. No. 755,477

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1984, 3426389

Int. Cl.[4] B01J *21/06, 23/04, 35/02*

U.S. Cl. 502—243 **19 Claims**

1. A molding made of silicate material which is comprised of a crystalline silicic acid with a layer structure with the general formula $H_2Si_yO_{2y+1}$, y being 1.7 to 24, in which the protons are completely or partly substituted by lithium, sodium, potassium or ammonium, or the corresponding hydrates.

4,703,030

PARTIALLY REDUCED FERRIC OXIDE CATALYST FOR THE MAKING OF AMMONIA VIA THE PHOTOASSISTED REDUCTION OF MOLECULAR NITROGEN AND METHOD FOR THE PREPARATION OF THE CATALYST

Khader, Mahmoud M., Albany, Calif., and Norman N. Lichtin, Newton, Mass., assignors to Trustees of Boston University, Boston, Mass.

Filed Jul. 31, 1986, Ser. No. 891,038

Int. Cl.[4] B01J *23/74*

U.S. Cl. 502—338 **16 Claims**

1. A method for preparing a partially reduced ferric oxide catalyst useful in photo assisted catalytic reactions, comprising the steps of:

exposing particles of iron oxide to a flowing mixture of molecular hydrogen and water vapor at a temperature ranging from about 350°–600° C. to yield a hydrogen reduced composition; and

heating said hydrogen reduced composition in an oxygen containing environment at a temperature ranging from about 350°–600° C. whereby a partially reduced ferric oxide catalyst containing not more than about 5 atom percent Fe(II) is obtained.

4,703,031

CATALYTIC REFORMING CATALYST WITH MODIFIED PORE SIZE DISTRIBUTION

Eugene E. Unmuth, Naperville, and Bruce A. Fleming, Chicago, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 884,736, Jul. 11, 1986. This application Oct. 30, 1986, Ser. No. 925,793

Int. Cl.[4] B01J *23/36, 23/42, 23/44, 23/62*

U.S. Cl. 502—339 **40 Claims**

1. In a naphtha reforming catalyst having at least one catalytic metal deposited on a porous solid catalyst support, an improvement which comprises the catalyst having the following in combination:

(A) A surface area above about 250M^2/gram of catalyst;

(B) A pore volume above about 0.4 cc/gram of catalyst in pores having diameters of from about 30 angstroms to about 38,000 angstroms; and

(C) A pore volume distribution wherein about 70 percent or less of said pore volume is in pores having diameters of from about 30 angstroms to about 400 angstroms, and 30 percent or more of said pore volume is in pores having diameters of from about 400 angstroms to about 38,000 angstroms.

4,703,032

ACTIVE COKE PRODUCED FROM PIT COAL AND PRODUCTION PROCESS THEREOF

Erich Sundermann, Braunschweig; Hans Reye, Neustadt, and Otto Abel, Clausthal-Zellerfeld, all of Fed. Rep. of Germany, assignors to Perfluktiv Technik AG, Zug, Switzerland

PCT No. PCT/EP85/00110, § 371 Date Jan. 9, 1986, § 102(e) Date Jan. 9, 1986, PCT Pub. No. WO85/04347, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 16, 1985, Ser. No. 810,284

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1984, 3410892

Int. Cl.[4] B01J *20/20*

U.S. Cl. 502—413 **7 Claims**

1. An active-coke granulate which is adapted to form a bed which can be traversed by a gas interacting with the active coke of the granulate, comprising granules each having a maximum dimension measured in two mutually perpendicular directions across the granule of 6 to 25 mm, each of said granules comprising:

(a) an inactive wear-resistant core made from a composition consisting at least in part of an expanded aluminosilicate-containing ceramic material and at least in part of a coal

selected from the group which consists of flaming coal, gas flaming coal and brown coal; and

(b) an activated coke coating formed from bituminous coal and in a thickness of 1 to 3 mm covering said core and adherent thereto.

5. A method of making an active-coke granulate which is adapted to form a bed which can be traversed by a gas interacting with the active coke of the granulate, comprising granules each having a maximum dimension measured in two mutually perpendicular directions across the granule of 6 to 25 mm, each of said granules comprising:

(a) an inactive wear-resistant core made from a composition consisting at least in part of an expanded aluminosilicate-containing ceramic material and at least in part of a coal selected from the group which consists of flaming coal, gas flaming coal and brown coal; and

(b) an activated coke coating formed from bituminous coal and in a thickness of 1 to 3 mm covering said core and adherent thereto, said method comprising the steps of:

(A) forming said composition by mixing said coal and said expanded aluminosilicate-containing ceramic material in a moist state and forming cores therefrom;

(B) coating the cores formed in step (A) with a mixture of ground bituminous coal, pitch, and an emulsion of water, anthracene or flux oil and ammonium sulphite waste liquor at room temperature by rolling pelletization;

(C) drying the coated cores formed in step (B); and

(D) subjecting the dried coated cores of step (C) to pyrolysis and activation to produce said granules with said activated coke coating.

4,703,033

NOVEL CYCLOSPORINS

Dieter Seebach, Zurich, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Mar. 7, 1986, Ser. No. 837,434

Claims priority, application United Kingdom, Mar. 11, 1985, 8506230; May 1, 1985, 8511029; Jan. 31, 1986, 8602370

Int. Cl.[4] A61K *37/02*; C07K *5/12*

U.S. Cl. 514—11 **17 Claims**

1. A cyclosporin having an optically active, α-N-methylated α-amino acid residue at the 3-position, said residue having the (D)-configuration.

4,703,034

NOVEL CYCLIC TETRAPEPTIDE

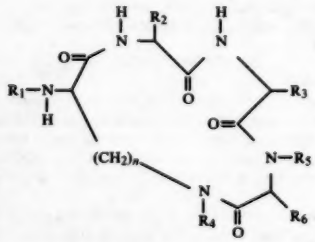
Roger Freidinger, Hatfield; Ruth F. Nutt, Green Lane; Terry A. Lyle, Lederach, all of Pa., and Richard Saperstein, Edison, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 28, 1986, Ser. No. 856,252

Int. Cl.[4] A61K *37/02*; C07K *5/12, 7/26*

U.S. Cl. 514—11 **13 Claims**

1. A compound having the formula:



I

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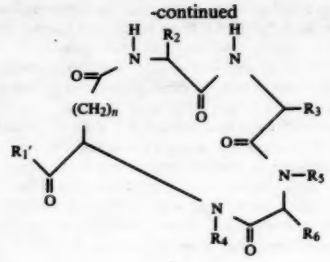
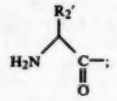


II

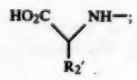
wherein:

n is 0 to 4;

R_1 is phenylloweralkanoyl, or an amino acid



R_1' is phenylloweralkylamino, or an amino acid



R_2 and R_2' are loweralkyl, benzyl, naphthylmethyl, indolylmethyl, substituted benzyl where the substituent may be one or two of loweralkyl, halogen, hydroxy, amino, nitro or loweralkoxy; and loweralkyl substituted with a 5- or 6-membered heterocyclic ring;

R_3 is 3-indolylmethyl, naphthylmethyl or substituted 3-indolylmethyl wherein the substituent may be loweralkyl, loweralkoxy, or halogen;

R_4 and R_5 are independently hydrogen or methyl

R_6 is aminocyclohexylmethyl, aminomethylbenzyl or

wherein Y is $(CH_2)_m$ and m is 0, 1 or 2 or sulfur such that the sulfur may be in any position along the chain.

4,703,035

HUMAN PANCREATIC GRF AMIDATED FRAGMENTS

Jean E. F. Rivier, La Jolla; Joachim Spiess, Encinitas, and Wylie W. Vale, Jr., La Jolla, all of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.

Continuation-in-part of Ser. No. 432,663, Oct. 4, 1982, Pat. No. 4,563,352. This application Oct. 2, 1985, Ser. No. 782,912

The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.

Int. Cl.[4] A61K *37/36, 37/43*; C07K *7/10*

U.S. Cl. 514—12 **8 Claims**

1. A synthetic peptide defined by the formula: H-Tyr-Ala-Asp-Ala-Ile-Phe-Thr-Asn-Ser-Tyr-Arg-Lys-Val-Leu-Gly-Gln-Leu-Ser-Ala-Arg-Lys-Leu-Leu-Gln-Asp-Ile-Met -Ser-Arg-Y wherein Y is NH_2, Gln-NH_2, Gln-Gln-NH_2 or Gln-Gln-Gly-NH_2 or a nontoxic salt thereof.

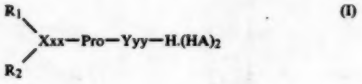
4,703,036

PEPTIDE-ALDEHYDES, PROCESS FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME

Sándor Bajusz; Erzsbet Szell nee Hasenöhrl; Daniel Bagdy; Eva Barabas, all of Budapest; Mariann Dioszegi, Kerepestarcsa; Zsuzsa Fittler, Budapest; Ferencz Jozsa, Budapest; Gyula Horvath, Budapest, and Eva Tomori nee Jozst, Budapest, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar RT, Budapest, Hungary

Filed Dec. 20, 1985, Ser. No. 811,937
Claims priority, application Hungary, Dec. 21, 1984, 4763/84
Int. Cl.[4] A61K *37/43;* C07K *5/08*
U.S. Cl. 514—18 10 Claims

1. A peptide-aldehyde derivative having the formula (I)



(I)

wherein

R_1 represents hydrogen or C_{1-6} alkyl group,

R_2 stands for C_{1-6} alkyl group, furthermore R_1 and R_2 are linked to the amino group of the Xxx alpha amino acid,

Xxx represents a D-phenylalanine residue or a D-alloisoleucine residue,

Pro stands for L-proline residue,

Yyy stands for L-, D- or DL-arginine residue, and

A represents an acid residue.

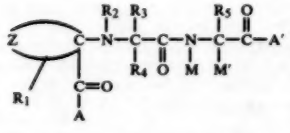
4,703,037

ANGIOTENSIN-CONVERTING ENZYME INHIBITORS

Fu-chih Huang, Boonton, N.J.; John T. Suh, Greenwich, Conn., and Jerry W. Skiles, Tuckahoe, N.Y., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Continuation of Ser. No. 690,386, Jan. 10, 1985, Pat. No. 4,585,758, which is a continuation of Ser. No. 496,756, May 20, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 830,422
Int. Cl.[4] A61K *37/02;* C07D *217/00;* C07C *61/06, 61/04, 61/08*
U.S. Cl. 514—19 10 Claims

1. Compounds of the formula



and their pharmaceutically-acceptable salts, wherein

A and A′ are independently hydroxy, lower alkoxy, or benzyloxy;

R_1 is hydrogen, lower alkyl, phenyl, or phenyl-lower alkyl;

R_4 is hydrogen, lower alkyl, or amino-lower alkyl;

R_2, R_3, and R_5 are hydrogen;

M is phenyl, 5-indanyl, 2-indanyl, or tolyl;

M′ is hydrogen; and

Z is a C_{2-5} alkyl.

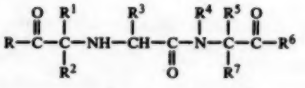
4,703,038

COMBINATION OF DIHYDROPYRIDINES WITH ANGIOTENSIN CONVERTING ENZYMES-INHIBITORS

Bernward Garthoff, Hilden; Stanislav Kazda, and Andreas Knorr, both of Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 7, 1985, Ser. No. 785,182
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1984, 3437917
Int. Cl.[4] A61K *31/455, 31/44, 37/02;* C07C *103/52*
U.S. Cl. 514—19 17 Claims

1. A combination of compounds comprising a compound of the formula I



(I)

wherein

R and R^6 are independently hydroxyl, C_1-C_4-alkoxy, C_2-C_4-alkenoxy, di-C_1-C_4-alkylamino- C_1-C_4-alkoxy, acylamino-C_1-C_4-alkoxy, acylamino-C_1-C_4 alkoxy, acyloxy-C_1-C_4-alkoxy, aryloxy, Ar-C_1-C_4-alkoxy, substituted aryloxy or substituted Ar-C_1-C_4-alkoxy, the substituent being methyl, halogen or methoxy, amino, C_1-C_4-alkylamino, di-C_1-C_4- alkylamino, aryl-C_1-C_4-alkylamino or hydroxylamino,

R^1 denotes hydrogen, alkyl with 1 to 20 carbon atoms, which includes branched cyclic and unsaturated alkyl groups, substituted C_1-C_4 alkyl, the substituent being halogen, hydroxyl, C_1-C_4-alkoxy, aryloxy, amino, C_1-C_4alkylamino, di-C_1-C_4-alkylamino, acylamino, arylamino, guanidino, imidazolyl, indolyl, mercapto, C_1-C_4-alkylthio, arylthio, carboxyl, carboxamido or carbo-C_1-C_4- alkoxy, phenyl, substituted phenyl, the substituent being C_1-C_4- alkyl, C_1-C_4-alkoxy or halogen, Ar-C_1-C_4-alkyl or heteroar-C_1-C_4- alkyl, Ar-C_2-C_4- alkenyl or heteroar-C_2-C_4alkenyl, substituted Ar-C_1-C_4-alkyl, substituted heteroar- C_1-C_4-alkyl, substituted Ar-C_2-C_4-alkenyl or substituted heteroar-C_2-C_4- alkneyl, the substituent being halogen or dihalogen, C_1-C_4-alkyl, hydroxyl, C_1-C_4- alkoxy, amino aminomethyl, acylamino, di-C_1-C_4-alkylamino, carboxyl, halogeno-C_1-C_4-alkyl, cyano or sulphoamido; or Ar-C_1-C_4 -alkyl or heteroar C_1-C_4- alkyl, which is substituted on the alkyl part by amino or acylamino,

R_2 and R_7 denote hydrogen or C_1-C_4-alkyl,

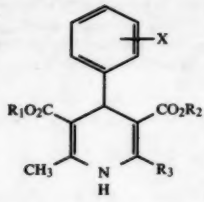
R_3 is hydrogen, C_1-C_4-alkyl, phenyl-C_1-C_4- alkyl, aminomethylphenyl- C_1-C_4-alkyl, hydroxyphenyl-C_1-C_4-alkyl, hydroxy-C_1-C_4- alkyl, acylamino-C_1-C_4-alkyl, amino-C_1-C_6-alkyl, dimethylamino-C_1-C_6alkyl, halogen-lower alkyl, guanidino-C_1-C_4-alkylm imidazolyl-C_1-C_4-alkyl, indolyl-C_1-C_4-alkyl, mercapto-C_1-C_4-alkyl or C_1-C_4-alkylthio-C_1-C_4-alkyl,

R^4 is hydrogen or C_1-C_4- alkyl and

R^5 is hydrogen, C_1-C_4-alkyl, phenyl, phenyl-C_1-C_4- alkyl, hydroxyphenyl-C_1-C_4alkyl, hydroxy-C_1-C_4-alkyl, amino-C_1-C_4-alkyl, amino-C_1-C_4-alkyl, guanidino-C_1-C_4- alkyl, imdazolyl-C_1-C_4- alkyl, indolyl- alkyl, mercapto, C_1-C_4-alkyl or C_1-C_4-alklyl or C_1-C_4-alkylthio-C_1-C_4-alkyl, or

R^4 and R^5 can be linked to one another to form an alkylene bridge with 2 to 4 carbon atoms, an alkylene bridge with 2 or 3 carbon atoms and one sulphur atom or an alkylene bridge which has 3 or 4 carbon atoms and contains a double bond or an alkylene bridge as above, substituted by hydroxyl, C_1-C_4-alkoxy, C_1-C_4-alkyl or di-C_1-C_4-alkyl,

and the pharmaceutically acceptable salts thereof, with a dihyropyridine compound of the formula II



(II)

in which

R^1 denotes C_1-C_4-alkyl, optionally substituted by C_1-C_3-alkoxy,

R^2 denotes C_1-C_{10}-alkyl, optionally substituted by C_1-C_3-alkoxy, trifluoromethyl, trifluoroethyl or N-methyl-N-benzylamino,

R_3 denotes C_1-C_4-alkyl, cyano or hydroxymethyl and X denotes 2- or 3-nitro, 2-chloro, 2,3-dichloro or a 2,3-ring member consisting of =N-O-N=.

4,703,039

METHOD OF PRODUCING BIOLOGICALLY ACTIVE MOLECULES HAVING EXTENDED LIFE TIME

Jack J. Hawiger, Chestnut Hill; Sheila Timmons, Boston, and Marek Kloczewiak, Jamaica Plain, all of Mass., assignors to New England Deaconess Hospital Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 598,711, Apr. 10, 1984, Pat. No. 4,666,884. This application Oct. 9, 1985, Ser. No. 786,241

Int. Cl.[4] A61K *37/02;* **C07K** *1/00*

U.S. Cl. 514—21 **19 Claims**

1. A method of inhibiting the in vivo reaction in a vertebrate between a naturally occurring protein and a protein or lipid receptor for said naturally occurring protein in said vertebrate comprising the steps of:

administering a conjugate formed of

one or more synthetic peptide analogs each of which is an analog of the interaction site on said naturally occurring protein for said receptor and is complementary to said receptor in said vertebrate, said synthetic peptide analog having a characteristic half-life in the circulatory system of said vertebrate; and

a nonimmunogenic carrier molecule selected from a group consisting of proteins, polysaccharides, lipids, glycolipids, phospholipids, and neutral lipids;

wherein said conjugate does not cause an immunological response in said vertebrate and is reactive with said receptor in said vertebrate through said synthetic peptide ananlog while being characterized by a half-life in the circulatory system of said vertebrate which is longer than the half-life of said synthetic peptide analog, and

whereby said conjugate inhibits the reaction of said naturally occurring protein by competing with said naturally occurring protein for reaction with said receptor in said vertebrate.

4,703,040

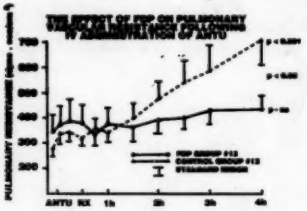
TREATMENT OF ADULT RESPIRATORY DISTRESS SYNDROME (ARDS) USING FRUCTOSE DIPHOSPHATE (FDP)

Angel K. Markov, 5973 Hanging Moss Rd., Jackson, Miss. 39206

Continuation-in-part of Ser. No. 719,504, Apr. 3, 1985, abandoned. This application Oct. 8, 1985, Ser. No. 785,778

Int. Cl.[4] C07H *11/04;* **A61K** *9/10, 31/66*

U.S. Cl. 514—23 **6 Claims**



1. A method for treating a mammalian subject experiencing adult respiratory distress syndrome (ARDS) comprising;

administering intravenously to the subject fructose-1,6-diphosphate in an amount sufficient to inhibit pulmonary microvascular damage.

4,703,041

D-GLUCURONIC ACID-UREA CONDENSATE PREPARATION FOR SMOOTHING HUMAN SKIN

Gephard Weber, Lempenmuhle, D-8602, Muhlhausen, and Karlheinz Schrader, Max Planck Str. 6, 3450 Holzminden 1, both of Fed. Rep. of Germany

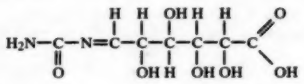
Continuation of Ser. No. 543,606, Oct. 20, 1983, abandoned. This application Sep. 5, 1985, Ser. No. 772,935

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1982, 3239317

Int. Cl.[4] A61K *7/48, 31/70*

U.S. Cl. 514—23 **7 Claims**

1. A composition for smoothing human skin which comprises a skin smoothing effective amount of D-glucuronic acid-urea condensate in a water/oil or oil/water emulsion; said condensate having the formula:



4,703,042

ORALLY ACTIVE HEPARIN SALTS CONTAINING MULTIVALENT CATIONIC UNITS

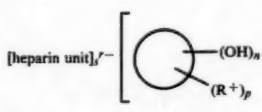
Nicholas S. Bodor, 7211 SW. 97th La., Gainesville, Fla. 32608

Continuation of Ser. No. 612,593, May 21, 1984, abandoned. This application Dec. 17, 1985, Ser. No. 808,689

Int. Cl.[4] A61K *31/725, 31/715;* **C08B** *37/10*

U.S. Cl. 514—56 **53 Claims**

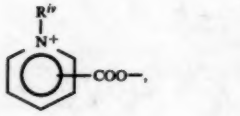
1. A salt of the structural formula



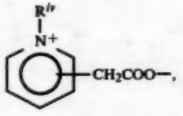
(I)

wherein ◯ is the skeleton of a polyol, said polyol being a

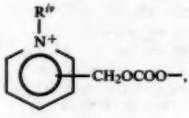
monosaccharide selected from the group consisting of pentoses, hexoses and heptoses, an oligosaccharide selected from the group consisting of disaccharides, trisaccharides and cyclodextrins, a C_3–C_{15} aliphatic polyhydroxy compound of a C_5–C_{18} alicyclic polyhydroxy compound, said skeleton being the portion of said polyol remaining after removal of all hydroxy substituents therefrom; n is a number from 3 to 24 which represents the total number of hydroxy groups in said polyol; p is a number ≥ 3 and $\leq n$; r is the available valence of the heparin unit and is ≥ 3 and ≤ 7; s is the number which when multiplied by r is equal to pv; v is the number which when multiplied by p is equal to rs; R^+ is



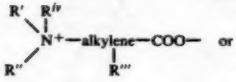
(a)



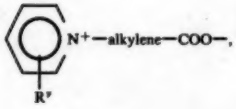
(b)



(c)



(d)



(e)

wherein the —COO—, —CH_2COO—, —CH_2OCOO— and R^v ring substituents can each be in the 2-, 3- or 4-position of the pyridinium ring; R^{iv} is C_1–C_3 alkyl; R′ and R″, which can be the same or different, are each C_1–C_7 alkyl, or R′ and R″ are combined with the adjacent nitrogen atom such that

represents the residue of a saturated monocyclic secondary amine; R‴ is a radical identical to the corresponding portion of a natural amino acid; the alkylene groups can be straight or branched and contain 1 to 3 carbon atoms; and R^v is H, —$CONH_2$ or —COO(C_1–C_7 alkyl).

4,703,043

PHOSPHONYL HYDROXYACYL AMINO ACID DERIVATIVES AS ANTIHYPERTENSIVE

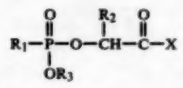
Donald S. Karanewsky, East Windsor, and Edward W. Petrillo, Jr., Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 608,752, May 10, 1984, abandoned, which is a division of Ser. No. 391,884, Jun. 23, 1982, Pat. No. 4,452,790. This application Dec. 16, 1985, Ser. No. 849,040

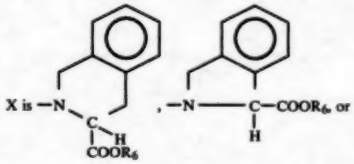
Int. Cl.[4] A61K *31/675*; C07F *9/62, 9/65*

U.S. Cl. 514—80 17 Claims

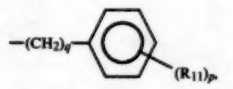
1. A compound of the formula



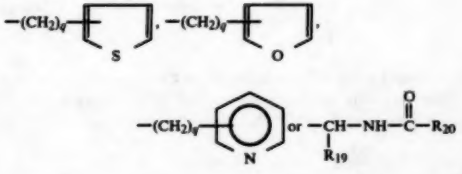
and pharmceutically acceptable salts thereof wherein:



R_1 is alkyl of 1 to 10 carbons, amino substituted lower alkyl, halo substituted lower alkyl,



—$(CH_2)_q$-cycloalkyl containing 3 to 7 carbons in the cycloalkyl portion,



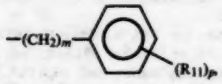
wherein q is zero or an interger from 1 to 7:

R_{11} is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkthio of 1 to 4 carbons, chloro, bromo, fluoro, trifluoromethyl, hydroxy, phenyl, phenoxy, phenylthio, or phenylmethyl;

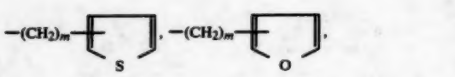
p is one, two or three provided that p is more than one only if R_{11} is hydrogen, methyl, methoxy, chloro, or fluoro;

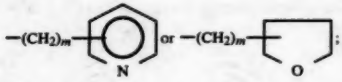
R_{19} and R_{20} are independently selected from the group

consisting of hydrogen, lower alkyl, halo substituted lower alkyl,



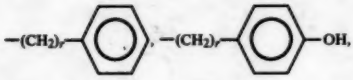
$-(CH_2)_m$-cycloalkyl containing 3 to 7 carbons in the cycloalkyl portion

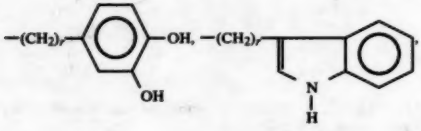


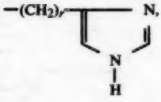


m is zero, one, two or three, wherein R_{11} and p are as defined above;

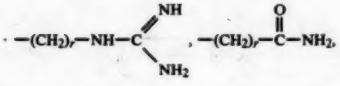
R_2 is hydrogen, lower alkyl, halo substituted lower alkyl,





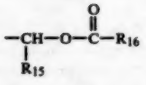


$-(CH_2)_r-NH_2$, $-(CH_2)_r-S$—lower alkyl,



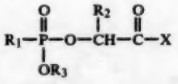
wherein r is an integer from 1 to 4;

R_3 and R_6 are independently selected from hydrogen, lower alkyl, benzyl, benzhydryl, alkali metal or



Wherein R_{15} is hydrogen, lower alkyl, cycloalkyl containing 3 to 7 carbons, or phenyl, and R_{16} is hydrogen, lower alkyl, lower alkoxy, phenyl, or R_{15} and R_{16} taken together are $-(CH_2)_2-$, $-(CH_2)_3$, —CH=CH—or

15. A composition useful for testing hypertension comprising a pharmaceutically acceptable carrier an an effective amount of hypotensive agent or pharmaceutically acceptable salt thereof of the formula



wherein X, R_1, R_2, and R_3 are as defined in claim 1.

17. The method of alleviating hypertension in a mammalian specie which comprises administering an effective amount of the composition of claim 15.

4,703,044

IMIDAZOQUINOLINES CONTAINING OTHER HETEROCYCLIC GROUPS, USEFUL AS ANTI-ULCER OR ANTI-SECRETORY AGENTS

Roger Crossley, Reading, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

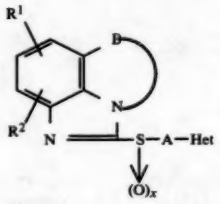
Continuation-in-part of Ser. No. 707,337, Mar. 1, 1985, abandoned, which is a continuation-in-part of Ser. No. 677,790, Dec. 4, 1984, abandoned. This application Dec. 11, 1985, Ser. No. 807,886

Claims priority, application United Kingdom, Dec. 16, 1983, 8333580; Sep. 28, 1984, 8424607; Dec. 14, 1984, 8431657

Int. Cl.[4] C07D *471/04, 215/12, 215/16, 487/04;* **A61K** *31/40, 31/435, 31/44, 31/47*

U.S. Cl. 514—292 **17 Claims**

1. A compound of formula I



wherein

A is a C_1–C_4 straight or branched carbon chain which may be saturated or unsaturated,

B is a C_2–C_4 straight or branched carbon chain which may be saturated or unsaturated,

R^1 and R^2 are the same or different and are hydrogen, C_1–C_6 alkyl, C_1–C_6 alkoxyalkyl, C_1–C_6 hydroxyalkyl, hydroxy, halogen, nitro, carboyx, carboxylic lower alkyl ester, carbamoyl, carbamoyloxy, cyano, lower alkanoyl, lower alkanoylamino or trifluromethyl, Het is a heterocyclic group joined via a carbon-carbon bond to A at the 2-, 3- or 4-position of the heterocyclic ring and chosen from imidazolyl, imidazolinyl, benzimidazolyl, thiazolyl, thiazolinyl, quinolyl, piperidyl, pyridyl, benzothiazolyl and pyrimidyl, any of which heterocyclic groups may be substituted by one or more of the following: halogen, C_{1-6} alkoxy, C_{7-12} phenylalkoxy, hydroxy, C_{1-6} hydroxylalkyl, C_{1-6} alkoxyalkyl, trifluoromethyl, C_{1-6} alkyl, phenyl or C_{7-12} phenylalkyl or disubstituted by a lower alkylene

dioxy radical of 1 to 6 carbon atoms, and x is 0 or 1, or pharmaceutically acceptable salts thereof.

15. A method of treating ulcers or hypersecretion in a mammal in need of such treatment, which method comprises administering to said mammal an anti-ulcer effective amount of a compound as claimed in claim 1.

4,703,045

THERAPEUTIC COMPOSITIONS FOR THE TREATMENT OF HANGOVER

Philippe M. Guinot, Paris, France, assignor to Societe de Conseils de Recherches et d'Applications Scientifiques, Paris, France

Division of Ser. No. 654,208, Sep. 24, 1984, Pat. No. 4,593,220. This application Mar. 10, 1986, Ser. No. 838,318

Claims priority, application United Kingdom, Sep. 24, 1983, 8325627

Int. Cl.[4] A61K *31/16, 31/19, 31/20, 31/52*

U.S. Cl. 514—159 **15 Claims**

1. A medicinal composition for oral administration comprising, in admixture with a therapeutically acceptable carrier, a hangover symptom relieving amount of a therapeutically acceptable betaine salt and one or more of (a) pain relieving amount of analgesic selected from within the group of acetyl salicyclic acid, a para-aminophenol derivative and ibuprofen, (b) an acid buffering amount of a buffering agent, and (c) an alertness inducing amount of caffeine.

4,703,046

CEPHEM COMPOUNDS AND PROCESSES FOR PREPARATION THEREOF

Ikuo Ueda, Toyonaka; Masakazu Kobayashi, Ikeda, and Tadashi Kitaguchi, Kukuchinishi, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Sep. 6, 1979, Ser. No. 72,990

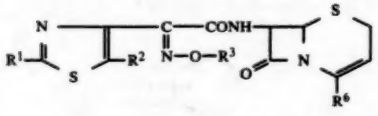
Claims priority, application United Kingdom, Sep. 8, 1978, 36131/78

The portion of the term of this patent subsequent to Jan. 24, 2001, has been disclaimed.

Int. Cl.[4] A61K *31/545;* **C07D** *501/20*

U.S. Cl. 514—202 **12 Claims**

1. A compound of the formula



wherein

R^2 is halogen;

R^1 is amino, lower alkanoylamino, or ar(lower)alkoxycarbonylamino;

R^3 is lower alkyl; and

R^6 is carboxy, alkali metal carboxylate, magnesium carboxylate, calcium carboxylate, ar(lower)alkyl carboxylate, or lower alkanoyloxyalkylcarboxylate, or

when R^1 is amino, a pharmaceutically acceptable acid addition salt thereof.

4,703,047

1-CYCLOPROPYL-1,4-DIHYDRO-4-OXO-7-(4-(2-OXO-1,3-DIOXOL-4-YL-METHYL)-1-PIPERAZINYL)-3-QUINOLINECARBOXYLIC ACID ANTIBACTERIAL AGENTS

Uwe Petersen, Leverkusen; Klaus Grohe, Odenthal; Hans-Joachim Zeiler, Velbert, and Karl G. Metzger, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

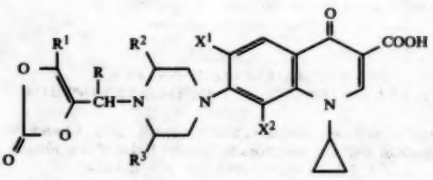
Filed Jan. 27, 1986, Ser. No. 822,714

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1985, 3504643

Int. Cl.[4] A61K *31/495;* **C07D** *405/14*

U.S. Cl. 514—254 **12 Claims**

1. A 1-cyclopropyl-1,4-dihydro-4-oxo-7-[4-(2-oxo-1,3-dioxol-4-yl-methyl)-1-piperazinyl]-3-quinolinecarboxylic acid of the formula



in which

R is hydrogen or, together with R^1, forms an alkylene radical with 2 or 3 carbon atoms,

R^1 is hydrogen, alkyl with 1 to 4 carbon atoms or phenyl,

R^2 and R^3 each independently is hydrogen, methyl, ethyl, cyclohexyl, methylene-dioxyphenyl, furyl, tetrahydrofuryl or thienyl; or phenyl which is optionally mono-, di or tri-substituted by fluorine, chlorine, bromine, methyl, phenyl, cyano, hydroxyl, methoxy, benzyloxy, amino, methylamino, dimethylamino, piperidino or nitro,

X^1 is hydrogen, halogen, or nitro, and

X^2 is hydrogen or halogen,

or a pharmaceutically acceptable hydrate, acid addition salt, alkali metal salt or alkaline earth metal salt thereof.

11. A method of combating bacteria which comprises administering to such bacteria, to a habitat thereof or to a patient infected therewith or to be protected therefrom an antibacterially effective amuount of a compound, hydrate or salt according to claim 1.

4,703,048

NOVEL 1-BENZHYDRYL-4-CINNAMYLPIPERAZINE DERIVATIVES, AND PHARMACEUTICAL COMPOSITIONS COMPRISING SAID COMPOUNDS AS ACTIVE INGREDIENT FOR TREATING A CEREBROVASCULAR DISEASE

Hiroshi Ohtaka; Toshiro Kanazawa; Keizo Ito, all of Osaka, and Goro Tsukamoto, Toyonaka, all of Japan, assignors to Kanebo Ltd., Tokyo, Japan

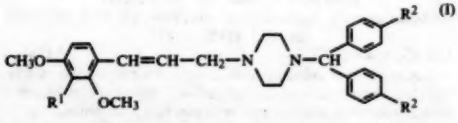
Filed Dec. 31, 1985, Ser. No. 815,452

Claims priority, application Japan, Jan. 11, 1985, 60-3696

Int. Cl.[4] A61K *31/495;* **C07D** *295/08*

U.S. Cl. 514—255 **11 Claims**

1. A 1-benzhydryl-4-cinnamylpiperazine compound of the following formula (I)

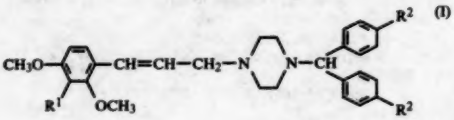


(I)

wherein R^1 represents a hydrogen atom or a methoxy group,

and R^2 represents a hydrogen or fluorine atom, or a pharmaceutically acceptable acid addition salt thereof.

11. A method for treating a cerebrovascular disease in a human, which comprises administering an amount, effective for treating said cerebrovascular disease, of a 1-benzhydryl-4-cinnamylpiperazine compound of the following formula (I)



(I)

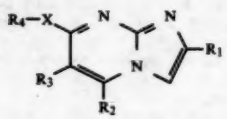
wherein R^1 represents a hydrogen atom or a methoxy group, and R^2 represents a hydrogen or fluorine atom, or a pharmaceutically acceptable acid addition salt thereof, to a human suffering from the cerebrovascular disease.

4,703,049
2-(1,2,4-OXADIAZOL-5-YL) AND 2-(1,3,4-THIADIAZOL-2-YL-IMIDAZO[1,2-a]PYRIMIDINES

Roger J. Gillespie, Swindon, and Wilfred R. Tully, Cirencester, both of England, assignors to Roussel Uclaf, Paris, France

Filed Dec. 12, 1985, Ser. No. 808,844
Claims priority, application United Kingdom, Dec. 19, 1984, 8432073
Int. Cl.[4] A61K *31/415*; C07D *235/02*
U.S. Cl. 514—258 17 Claims

1. A compound selected from the group consisting of a compound of the formula



I

wherein R_1 is selected from the group consisting of 1,2,4-oxadiazol-5-yl and 1,3,4-thiadiazol-2-yl, both optionally substituted with alkyl of 1 to 3 carbon atoms or alkenyl of 2 to 5 carbon atoms and 1,2,4-oxadiazol-3-yl and 1,3,4-oxadiazol-2-yl, both optionally substituted with alkenyl of 2 to 5 carbon atoms, alkyl of 1 to 3 carbon atoms or alkyl of 1 to 3 carbon atoms substituted with at least one fluorine, R_2 and R_3 are individually selected from the group consisting of hydrogen, alkyl of 1 to 3 carbon atoms and alkenyl of 2 to 5 carbon atoms or together form alkylene of 3 to 5 carbon atoms, X is selected from the group consisting of —O— and —S—, R_4 is alkyl of 1 to 3 carbon atoms and their non-toxic pharmaceutically acceptable acid addition salts.

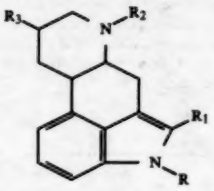
6. A anxiolytic composition comprising an anxiolytically effective amount of at least one compound of claim 1 and an inert pharmaceutical carrier.

4,703,050
METHODS OF INDUCING NEURON PROTECTIVE ACTIVITY

Lucien Nedelec, Le Raincy, France, assignor to Roussel Uclaf, Paris, France

Filed Nov. 6, 1986, Ser. No. 927,751
Claims priority, application France, Nov. 13, 1985, 85 16743
Int. Cl.[4] A61K *31/435*
U.S. Cl. 514—277 7 Claims

1. A method of inducing neuron protective activity in warm-blooded animals comprising administering to a warm-blooded animal requiring neuron protective activity an amount sufficient to induce neuron protective activity of at least one compound of the formula



I

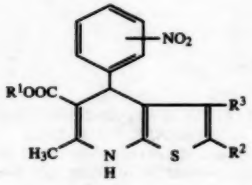
wherein R and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, R_1 is selected from the group consisting of hydrogen, chlorine and bromine and R_3 is alkylthiomethyl of 1 to 4 alkyl carbon atoms, the dotted line indicates the optional presence of a double bond and a non-toxic, pharmaceutically acceptable acid addition salt.

4,703,051
4,7-DIHYDROTHIENO[2,3-b]PYRIDINE DERIVATIVES USEFUL IN THE TREATMENT OF CARDIOVASCULAR DISEASES

Ikuo Adachi; Yoshiharu Hiramatsu; Motohiko Ueda, all of Osaka, and Masaru Kawakami, Hyogo, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

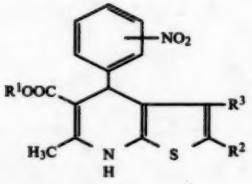
Filed Jun. 2, 1986, Ser. No. 876,120
Claims priority, application Japan, Jul. 3, 1985, 60-147054
Int. Cl.[4] A61K *31/44*; C07D *495/04*
U.S. Cl. 514—291 9 Claims

1. A 4,7-dihydrothieno[2,3-b]pyridine derivative of the formula:



wherein R^1 is straight or branched chain C_1–C_4 alkyl, alkoxyalkyl, or phenyl(C_1–C_5)alkyl; R^2 is hydrogen, straight or branched chain C_1–C_4 alkyl, or alkoxycarbonyl; R^3 is hydrogen, straight or branched chain C_1–C_4 alkyl, phenyl which may be substituted by one or more halogens or alkoxy groups, cycloalkyl, or cycloalkylalkyl; or R^2 and R^3 taken together may form a C_3–C_6 alkylene.

9. A composition for treatment of cardiovascular diseases containing inert diluents and a therapeutically effective amount of a compound of the formula:



wherein R^1 is straight or branched chain C_1–C_4 alkyl, alkoxyalkyl, or phenyl(C_1–C_5)alkyl; R^2 is hydrogen, straight or branched chain C_1–C_4 alkyl, or alkoxycarbonyl; R^3 is hydrogen, straight or branched chain C_1–C_4 alkyl, phenyl which

may be substituted by one or more halogens or alkoxy groups, cycloalkyl, or cycloalkylalkyl; or R^2 and R^3 take together may form a C_3–C_6 alkylene.

4,703,052

HYPOGLYCEMIC THIAZOLIDINEDIONES

James F. Eggler, Stonington; Robert A. Volkmann, Ledyard; Gerald F. Holland, Old Lyme; Michael R. Johnson, Gales Ferry, all of Conn., assignor to Pfizer Inc., New York, N.Y.

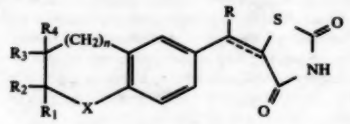
PCT No. PCT/US85/00962, § 371 Date Dec. 29, 1986, § 102(e) Date Dec. 29, 1986

PCT Filed May 21, 1985, Ser. No. 10,081

Int. Cl.[4] C07D *417/10;* A61K *31/425*

U.S. Cl. 514—337 **19 Claims**

1. A compound of the formula



or a pharmaceutically acceptable cationic salt thereof, wherein the broken line is a bond or no bond,

n is zero, 1 or 2;

X is O, S,

R is H, CH_3 or C_2H_5;

when taken separately, R_1 is H, (C_5–C_7)cycloalkyl, (C_6–C_8) methylsubstituted cycloalkyl, pyridyl, thienyl, furyl, naphthyl, p-biphenylyl, tetrahydrofuranyl, tetrahydrothienyl, tetrahydropyranyl, $C_6H_4W_2$ or alk-W_1 and alk is (C_1–C_6)alkylene, ethylidene or isopropylidene; W_1 is H, OH, (C_1–C_4)alkoxy, (C_1–C_4)thioalkyl, pyridyl, furyl, thienyl, tetrahydrofuryl, tetrahydrothienyl, naphthyl, (C_5–C_7)cycloalkyl or $C_6H_4W_2$ and W_2 is H, OH, F, Cl, Br, (C_1–C_4)alkyl, (C_1–C_4)alkoxy or (C_1–C_4)thioalkyl; R_2 is H or CH_3, R_3 is H, (C_1–C_6)alkyl, $C_6H_4W_2$ or benzyl; and R_4 is H;

when R_1 and R_2 are taken together they form (C_4–C_6)alkylene and R_3 and R_4 are each H;

when R_3 and R_4 are taken together they form (C_4–C_6)alkylene and R_1 and R_2 are each H; and when R_2 and R_3 are taken together they are (C_3–C_4)alkylene and R_1 and R_4 are each H.

4,703,053

BENZOTHIOPHENES AND BENZOFURANS AND ANTIALLERGIC USE THEREOF

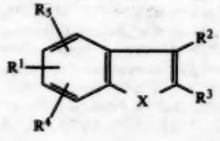
David T. Connor; Wlaczeslaw A. Cetenko; Paul C. Unangst, all of Ann Arbor, Mich., and Elizabeth A. Johnson, Corte Madera, Calif., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 28, 1985, Ser. No. 790,664

Int. Cl.[4] C07D *405/04, 405/12, 409/04;* A61K *31/41*

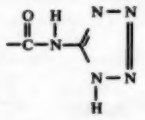
U.S. Cl. 514—382 **51 Claims**

1. A compound having the formula:



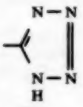
I

wherein (1) R^1, R^4, and R^5 are H, alkyl of from one to twelve carbons, inclusive, alkoxy of from one to twelve carbons, inclusive, hydroxy, aryl, R^1 taken twice having each an adjacent carbons such that two R^1s together are methylenedioxy, nitro, amino, substituted amino, mercapto, alkylthio of from one to four carbons, inclusive, alkylsulfinyl of from one to four carbons, inclusive, alkysulfonyl for from one to four carbons, inclusive, arylthio, arylsulfinyl, arylsufonyl, or halogen; (2) R^2 is alkoxy of from one to twelve carbons, inclusive, arylmethoxy, amino, substituted amino, mercapto, alkylthio of from one to four carbons, inclusive alkylsulfinyl of from one to four carbons, inclusive, alkylsulfonyl of from one to four carbons, inclusive, arylthio, arylsulfinyl, or arylsulfonyl; and (3) R^3 is A or B



A

or



B

and (4) X is oxygen or S(O)q wherein q is zero, one, or two; and pharmaceutically acceptable salts thereof.

51. A method of treating allergies in mammals which comprises administering to such mammal in need thereof an effective amount of a pharmaceutical compound according to claim 1.

4,703,054

NOOTROPIC IMIDAZOLIDINONES

Mario Pinza, Milan; Carlo Farina, Como; Silvano Banfi, and Ugo Pfeiffer, both of Milan, all of Italy, assignors to ISF, S.p.A., Milan, Italy

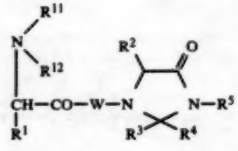
Filed Jun. 20, 1986, Ser. No. 876,946

Claims priority, application Italy, Jun. 21, 1985, 21236 A/85

Int. Cl.[4] A61K *31/415;* C07D *233/38*

U.S. Cl. 514—386 **12 Claims**

1. A compound of Structure (1):



(1)

in which

R^1 is H, C_{1-5}alkyl (straight or branched), or phenyl;

W is a bond, —NHCHR[6]CO— or —NHCHR[6]CONHCHR-[7]CO—, where R^6 and R^7, which can be the same or different are H or C_{1-5}alkyl (straight or branched);

R^2 is H, C_{1-5}alkyl (straight or branched), C_6-C_{10} aryl or a benzyl group optionally substituted by C_{1-5} alkyl (straight or branched), C_{1-4} alkoxy (straight or branched) or hydroxy;

R^3 and R^4, which can be the same or different, are H, C_{1-5}alkyl (straight or branched) or phenyl, or R^3 and R^4 are taken together to form a 1,4-butylene or 1,5-pentylene group;

R^5 is H or —CHR[8]CONR[9]R[10], where R^8, R^9 and R^{10},

which can be the same or different, are H or C_{1-5}alkyl (straight or branched);

R^{11} and R^{12}, which can be the same or different, are H, C_{1-5}alkyl (straight or branched), benzyl or lower alkanoyl or C_7–C_{11} aroyl taken together with the nitrogen atom shown to form a 2-oxopyrrolidino group optionally substituted in the 4-position by a hydroxy or C_{1-5} (straight or branched) alkoxy group, or a 5-oxo-1-imidazolidine group optionally substituted at the 2- position by one or two C_{1-5} alkyl groups or a 1,4-butylene or 1,5-pentylene group, or optionally substituted at the 4-position by C_{1-5} alkyl,

or a pharmaceutically acceptable salt thereof.

12. A method of restoring learning and treating memory difficulties which comprises administering to a mammal in need thereof a non-toxic effective amount of a compound of Structure (I) of claim 1 or a pharmaceutically acceptable salt thereof.

4,703,055

BENZAMIDES AND THERAPEUTIC USE THEREOF

Jacqueline Franceschini, L'Hay-les-Roses; Renée Gardaix-Luthereau, Cachan, and Josette Margarit, Paris, all of France, assignors to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France, Paris, France

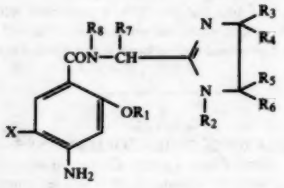
Filed Jul. 7, 1986, Ser. No. 882,253

Claims priority, application France, Jul. 4, 1985, 85 10199

Int. Cl.[4] C07D *233/54;* A61K *31/415*

U.S. Cl. 514—400 **10 Claims**

1. Benzamide compounds and pharmacologically acceptable salts thereof of the following general formula (I):



(I)

in which:

R_1 is a C_1–C_3 alkyl, a C_2–C_3 alkenyl or a hydrogen atom;

R_2 is a C_1–C_3 alkyl, C_2–C_3 alkenyl, benzyl, C_3–C_8 cycloalkyl C_1–C_3 alkyl, C_5–C_8 cycloalkenyl C_1–C_3 alkyl or a hydrogen atom;

R_3, R_4, R_5, R_6 R_7 and R_8 each are a C_1–C_3 alkyl or a hydrogen atom; and

X is a halogen atom.

10. A pharmaceutical composition for treating patients subject to digestive disorders comprising (a) a therapeutically effective amount of a benzamide compound or a pharmacologically acceptable salt thereof according to claim 1 as active ingredient and (b) a pharmaceutically acceptable excipient.

4,703,056

NEW ALKYL DIAMINE DERIVATIVES

Kálmán Hideg; Olga H. Hankovszky, both of Pécs; László Frank, Tiszavasvári; Ilona Bódi, Tiszavasvári, and József Csák, Tiszavasvári, all of Hungary, assignors to Alkaloida Vegyeszeti Gyar, Tiszavasvari, Hungary

PCT No. PCT/HU84/00005, § 371 Date Sep. 20, 1984, § 102(e) Date Sep. 20, 1984, PCT Pub. No. WO84/02907, PCT Pub. Date Aug. 2, 1984

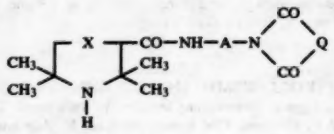
PCT Filed Jan. 23, 1984, Ser. No. 662,298

Claims priority, application Hungary, Jan. 21, 1983, 191/83; Feb. 4, 1983, 384/83; Feb. 4, 1983, 385/83; Feb. 4, 1983, 386/83

Int. Cl.[4] A61K *31/40;* C07D *403/12*

U.S. Cl. 514—414 **6 Claims**

1. A compound of the formula (I)



wherein

A is C1 to C5 alkylene which can be substituted by hydroxyl;

X is a single or a double bond; and

Q is a 6-membered carbocyclic moiety fused to each of the adjacent carbonyl carbon atoms, and which is either fully hydrogenated, partially hydrogenated, or aromatic, or a pharmaceutically acceptable acid addition salt thereof.

6. A method of treating arrhythmia in an animal subject which comprises the step of administering to said subject in need of antiarrhythmic treatment, a therapeutically effective amount of the compound of the Formula (I) defined in claim 1 or a pharmaceutically acceptable salt thereof.

4,703,057

BETA-BLOCKING THIOCHROMAN DERIVATIVES, COMPOSITIONS AND METHOD OF USE THEREFOR

Bernard Marchand, Checy, and Yves M. Gargouil, Paris, both of France, assignors to ADIR Et Compagnie, Neuilly-sur-Seine, France

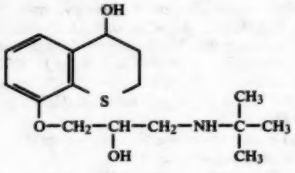
Filed Sep. 30, 1986, Ser. No. 913,351

Claims priority, application France, Oct. 4, 1985, 85 14755

Int. Cl.[4] A61K *27/00;* C07D *65/00, 335/06*

U.S. Cl. 514—432 **6 Claims**

1. Compound of the formula I:



(I)

in racemic form or in the form of an optical isomer or an addition salt thereof with a pharmaceutically-acceptable mineral or organic acid.

2. Pharmaceutical composition having beta-blocking activity containing as active ingredient an effective beta-blocking amount of compound according to claim 1, in association or in admixture with a pharmaceutically acceptable, inert, non-toxic excipient or carrier.

4. Method of treating a patient in need of treatment with a beta-blocker which comprises the step of administering an effective beta-blocking amount of a compound of claim 1 to said patient.

4,703,058

β-METHYLENE FURANETHANAMINES AND USE AS ANTI-HYPERTENSIVE AGENTS

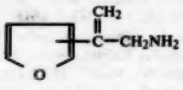
Thomas M. Bargar, Zionsville; Robert Broersma, Jr., Noblesville, and James R. McCarthy, Zionsville, all of Ind., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation of Ser. No. 687,627, Dec. 31, 1984, abandoned. This application Jun. 6, 1986, Ser. No. 871,656

Int. Cl.[4] A61K *31/34;* C07D *307/52*

U.S. Cl. 514—471 **4 Claims**

1. A compound of the formula



and the non-toxic pharmaceutically acceptable acid addition salts thereof.

4. A method of treating hypertension in mammals which comprises administering to said mammal an effective amount of an allylic amine of claim 1.

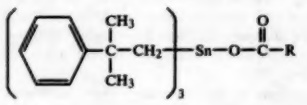
4,703,059

TRIS(BETA,BETA-DIMETHYLPHENETHYL) TIN COMPOUNDS

Toshio Kano; Masamichi Knodo, both of Sagamihara; Tatsufumi Ikeda, Nagano, and Chiharu Morikawa, Suzaka, all of Japan, assignors to Yashima Chemical Industrial Co., Ltd., Tokyo, Japan

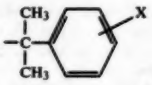
Filed Sep. 13, 1985, Ser. No. 776,027
Claims priority, application Japan, Sep. 18, 1984, 59-193975
Int. Cl.[4] A01N *55/04*; A61K *31/32*
U.S. Cl. 514—493 **6 Claims**

1. A compound represented by the formula



(I)

wherein R represents an alkyl group having 7 to 11 carbon atoms, a phenyl group which is substituted by 3-isopropyl, 2-chloro or 2,4-dichloro, or a group of the formula



in which X represents a chlorine or bromine.

4,703,060

NUTRITIVE COMPOSITIONS CONTAINING FATTY SUBSTANCES AND A PROCESS FOR THE PREPARATION THEREOF

Helmut Traitler, and Heike Winter, both of Vevey, Switzerland, assignors to Nestec S.A., Vevey, Switzerland

Continuation-in-part of Ser. No. 482,429, Apr. 6, 1983, abandoned. This application Oct. 14, 1983, Ser. No. 542,149
Int. Cl.[4] A61K *31/22*
U.S. Cl. 514—549 **30 Claims**

1. A process to obtain a refined oil containing gamma-linolenic acid comprising washing pips of the Ribes genus with a solvent selected from the group consisting of an organic polar solvent and a supercritical fluid in a polar condition, separating the solvent from the washed pips, extracting oil from the washed pips with a solvent selected from the group consisting of an organic non-polar solvent and a supercritical fluid in a slightly polar condition and then removing the solvent or supercritical fluid from the oil.

4,703,061

GAMMA-AMINOBUTYRIC ACID DERIVATIVES, PROCESS FOR PRODUCTION THEREOF, AND USE THEREOF AS MEDICAMENTS

Tsutomu Kameyama, Nagoya; Jiro Kitamura, Gifu; Tetsuo Takigawa, and Masao Mizuno, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Okayama, Japan

Filed Jul. 9, 1985, Ser. No. 753,613
Claims priority, application Japan, Jul. 13, 1984, 59-146553
Int. Cl.[4] C07C *103/48*; A61K *31/22*
U.S. Cl. 514—551 **3 Claims**

3. A method for preventing or treating an impediment of memory induced by derangement in the regulation of metabolism in the brain, in a human suffering from said impediment, which comprises administering an effective amount of 4-(3,5-dihydroxy-3-methylpentylamide) butyric acid or a pharmaceutically acceptable salt or lower alkyl ester thereof to said human.

4,703,062

PARENTERAL NUTRITION WITH MEDIUM AND LONG CHAIN TRIGLYCERIDES

George L. Blackburn, Cambridge; Vigen K. Babayan, Waban; Bruce Bistrian, Ipswich, all of Mass.; Lyle L. Moldawer, Molndal, Sweden, and Richard Cotter, Libertyville, Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 571,021, Jan. 16, 1984, abandoned. This application Sep. 9, 1985, Ser. No. 774,254
Int. Cl.[4] A21K *31/23*
U.S. Cl. 514—552 **4 Claims**

1. A method of treating septicemia comprising parenterally administering a composition including MCT's and LCT's to a patient with septicemia, the proportion of MCT's to LCT's ranging about from 1:3 to 3:1.

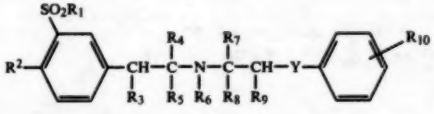
4,703,063

SULFAMOYL SUBSTITUTED PHENETHYLAMINE DERIVATIVES AND PROCESS OF PRODUCING THEM

Kazuo Imai; Kunihiro Niigata; Takashi Fujikura, all of Saitama; Shinichi Hashimoto, Chiba, and Toichi Takenaka, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 632,258, Jul. 18, 1984, Pat. No. 4,558,156, which is a continuation of Ser. No. 403,006, Jul. 29, 1982, abandoned, which is a division of Ser. No. 231,421, Feb. 4, 1981, Pat. No. 4,373,106. This application Jul. 18, 1985, Ser. No. 756,790
Claims priority, application Japan, Feb. 8, 1980, 55-14382
Int. Cl.[4] C07C *143/78, 143/80*; A61K *31/18*
U.S. Cl. 514—603 **19 Claims**

1. Sulfamoyl-substituted phenethylamine derivatives represented by the general formula



wherein R_1 represents an amino group or a mono- or di-lower alkylamino group; R_2 represents a hydroxyl group, a lower alkyl group, or a lower alkoxy group; R_3 represents a hydrogen atom, a lower alkoxy group or a lower alkyl group; R_4, R_5, R_6, R_7, R_8, and R_9 each represents a hydrogen atom or a lower alkyl group; R_{10} represents a hydrogen atom, a lower alkyl group, or a lower alkoxy group; and Y represents an oxygen atom, and the salts thereof.

2. A pharmaceutical composition containing an effective α-adrenergic antagonistic amount of a compound of claim 1 and a pharmaceutically acceptable excipient.

4,703,064

PROCESS FOR PRODUCING ALCOHOLS

Bernard D. Dombek, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 279,095, Jun. 30, 1981, abandoned, and a continuation-in-part of Ser. No. 359,778, Mar. 19, 1982, abandoned, which is a continuation of Ser. No. 91,242, Nov. 11, 1979, abandoned. This application Nov. 28, 1983, Ser. No. 555,637

Int. Cl.[4] C07C *27/06, 67/00*

U.S. Cl. 518—700 31 Claims

1. The process for making the products methanol, ethylene glycol and ethanol directly from the reaction of hydrogen and carbon monoxide which comprises reacting in a solvent-containing liquid phase a mixture of hydrogen and carbon monoxide in the presence of a ruthenium carbonyl complex catalyst at a temperature between about 50° C. and 400° C. and a pressure between about 500 psia (35.15 Kg/cm^2) and 15,000 psia (1,054.6 Kg/cm^2) wherein the ruthenium carbonyl catalyst is characterized by a synergistic combination of $Ru(CO)_3I_3^-$ and $HRu_3(CO)_{11}^-$ such being characterized by an infrared spectrum having three significant infrared bands between about plus or minus 10 cm^{-1} of about 2100 cm^{-1}, 2015 cm^{-1}, and 1990 cm^{-1}.

4,703,065

FOAM CUPS WITH ENHANCED COFFEE RETENTION

Fred M. Sonnenberg, Merion, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 5, 1987, Ser. No. 11,654

Int. Cl.[4] C07J *9/22;* B05D *7/00*

U.S. Cl. 521—57 5 Claims

1. A method for enhancing the coffee retentiveness of molded foam cups made from foamable styrene polymer particles which have been impregnated with a blowing agent which comprises coating the thermoplastic polymer particles with an effective amount of a fluorosurfactant having the general formula

$$R—CH_2—X,$$

wherein R represents a perfluoroalkyl group having from 6 to 16 carbon atoms; wherein X represents $—CH_2SCH_2CH_2CO_2Li$, $—CH_2SO_3H$, $—CH_2SO_3NH_4$, $—CH_2O(CH_2CH_2O)_xH$, $—CH_2O(CH_2CH_2O)_yH$, $—CH_2SCH_2CH_2N^+(CH_3)_3CH_3SO_4^-$, $—CH(OCOCH_3)CH_2N^+(CH_3)_2CH_2CO_2^-$, and

and wherein x represents an integer from 8 to 14, y represents an integer from 4 to 7, R′ represents $—OCH_2CH_2R$ or —OM, and M represents —H, $—NH_4$, or $—NH_2(CH_2CH_2OH)_2$, said fluorosurfactant being present in sufficient quantity to retard the rate at which coffee leaks through said molded foam cups as compared to the rate at which coffee leaks in the absence of said fluorosurfactant.

4,703,066

POLYOLEFIN PARTICLES AND PROCESS FOR PREPARING THE SAME

Masao Nakagawa, Kobe, Japan, assignor to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 859,589, May 5, 1986, Pat. No. 4,665,102. This application Mar. 2, 1987, Ser. No. 20,976

Claims priority, application Japan, May 8, 1985, 60-97548

Int. Cl.[4] C08J *9/22*

U.S. Cl. 521—60 1 Claim

1. A particle of a polyolefin whose surface region is halogenated and which contains a volatile blowing agent.

4,703,067

PROCESS FOR PREPARING DRY SOLID WATER ABSORBING POLYACRYLATE RESIN

Muneharu Mikita, Takatsuki; Shozo Tanioku, Nara, and Takayasu Touda, Osaka, all of Japan, assignors to American Colloid Company, Arlington Heights, Ill.

Division of Ser. No. 730,638, May 6, 1985, Pat. No. 4,654,393, which is a division of Ser. No. 436,428, Oct. 25, 1982, Pat. No. 4,552,938. This application Feb. 19, 1987, Ser. No. 15,262

Claims priority, application Japan, Oct. 26, 1981, 57-171559; Jul. 21, 1982, 58-128266

Int. Cl.[4] C08F *220/06*

U.S. Cl. 521—63 6 Claims

1. A process for preparing a solid, water absorbing, cross-linked resin comprising:

combining a monomer mixture of (A) potassium acrylate; and (B) a water miscible or water soluble polyvinyl monomer, with water in an amount of 55 to 80 combined weight percent of (A) plus (B) based on the total weight of (A) plus (B) plus water to form a monomer mixture wherein the monomers of the monomer mixture consist essentially of (A) and (B);

adding a polymerization initiator to said monomer mixture capable of initiating, and in an amount sufficient to initiate polymerization of said monomer mixture;

depositing said monomer mixture including said initiator onto a support surface in sheet form for polymerization and cross-linking; and

polymerizing said monomer mixture while utilizing the exothermic heat of reaction as substantially the only non-ambient energy source to drive water away from said polyacrylate resin to form said cross-linked polyacrylate resin having a water content sufficiently low to be powdered without an intermediate drying step.

4,703,068

METHOD FOR MAKING A DICYCLOPENTADIENE CROSS-LINKED POLYMER AND THE PRODUCT THEREOF

Tuyen T. Nguyen, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 554,467, Nov. 22, 1983, abandoned. This application Apr. 15, 1985, Ser. No. 723,022

Int. Cl.[4] C08F *2/02, 4/68, 36/00*

U.S. Cl. 521—150 21 Claims

1. A method of making a cross-linked substantially transparent low haze polymer comprising combining a plurality of reactant streams to form a polymerization solution, one reactant stream containing an organo aluminum activator of a metathesis catalyst system; a second reactant stream containing a catalyst of said metathesis-catalyst system, where the catalyst of the metathesis-catalyst system is a pentavalent tantalum catalyst represented by the formula Ta—Y_5, where Y is selected from the group of halides; —O—R, where R is a hydrocarbyl containing from 1 to 10 carbon atoms; and —OOCR′, where R′ is a hydrocarbyl containing from 1 to 10 carbon atoms; and at least one reactant stream containing dicyclopentadiene under polymerization conditions said polymerization stream comprising cycloolefin monomer, said monomer being

at least 80 percent by weight dicyclopentadiene, and then recovering the cross-linked substantially transparent polymer having a percent haze of less than 25 percent.

4,703,069

POLYETHER POLYOLS, THEIR MANUFACTURE AND USE IN POLYURETHANES PRODUCTION

James P. Brown, Sterrebeek; Ronald N. May, Brussels, and David Randall, Erps Kwerps, all of Belgium, assignors to Imperial Chemical Industries plc, London, England

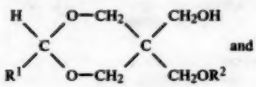
Filed Jun. 27, 1986, Ser. No. 879,435

Claims priority, application United Kingdom, Jul. 1, 1985, 8516618

Int. Cl.[4] C08G *18/14*

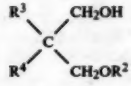
U.S. Cl. 521—174 9 Claims

1. A polyether polyol having an average hydroxyl value in the range of 100 to 250 mgKOH/g which is an alkoxylated derivative of a polyhydric alcohol obtained as by-product in pentaerythritol manufacture and consisting essentially of a mixture of compounds according to formula (I)



(I)

and



(II)

wherein

R^1 is H, CH_3 or OCH_3

R^2 is H, CH_2OH or $CH_2C(CH_2OH)_3$

R^3 and R^4 which may be the same or different are H, CH_2OH, CH_2OCH_3 provided that only one of R^3 or R_4 may be CH_2OCH_3.

4,703,070

SILICONE RUBBER CONTAINMENT OF ORGANIC LIQUIDS

George A. Locke, Trenton, and Charles R. Frihart, Lawrenceville, both of N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Jul. 16, 1986, Ser. No. 886,986

Int. Cl.[4] A61L *9/01*

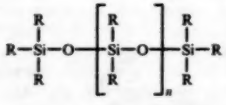
U.S. Cl. 523—102 7 Claims

1. A device for the slow-release of a volatile, organic liquid to the atmosphere, which comprises;

a body of a silicone rubber matrix;

said matrix having dispersed therein the volatile, organic liquid, and an effective amount of a compatibilizing agent for compatibilization of the volatile, organic liquid with the silicone rubber, said agent comprising a member selected from the group consisting of

(A) polysiloxanes of the general formula:

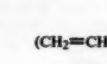


wherein n is an integer of at least 1 and such that the molecular weight (average) of the agent does not exceed about 20,000; R is selected from an aliphatic or aromatic chain of 1 to 8 carbon atoms;

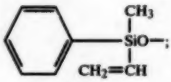
(B) a compound selected from ethylene-dimethylsiloxane oxide ABA block copolymers wherein the B segment is represented by the general formula given above, (C) derivatives of the polysiloxanes (A); which are terminated by groups selected from carbinol groups of the formula:

$$—CH_2—CH_2—OH$$

divinyl methyl groups of the formula:



or vinylphenylmethyl groups of the formula:



(D) compounds that are fluorine-containing polar hydrocarbons with polar groups.

4,703,071

STABILIZED AQUEOUS COATINGS CONTAINING ZINC OXIDE

Phillip M. Owens, Strongsville, Ohio, assignor to The Glidden Company, Cleveland, Ohio

Filed Jan. 27, 1986, Ser. No. 823,070

Int. Cl.[4] C08K *3/22*

U.S. Cl. 523—403 5 Claims

1. A stable aqueous single package C-enamel useful for coating metal substrate which comprises a blend of

(a) a dispersion of zinc oxide pigment in an alcohol solvent containing a stabilizing amount of a dispersant selected from the group consisting of alkylated urea formaldehyde resin or alkylated melamine resin wherein a major portion of the alkyl groups of said resin are butyl groups or higher alkyl groups; and

(b) an aqueous mixture of epoxy-acrylic resin prepared by solvent polymerization with an acrylic latex resin prepared by polymerization in an aqueous medium.

4,703,072

TETRAHYDROFURANCARBOXYLIC ACID DERIVATIVES

Reinhard Helwig, Ludwigshafen; Peter Neumann, Wiesloch; Alexander Aumueller, Ludwigshafen, and Hubert Trauth, Dudenhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

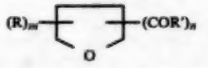
Filed Jun. 16, 1986, Ser. No. 874,864

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522678

Int. Cl.[4] C08K *5/34*

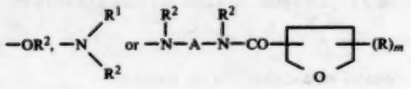
U.S. Cl. 524—99 6 Claims

1. A tetrahydrofurancarboxylic acid derivative of the formula I

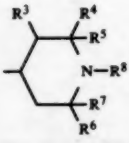


(I)

where the radicals R independently of one another are each $C_1$14 C_4-alkyl, cyclohexyl or phenyl, m is from 0 to 3, n is 1 or 2, and R′ is a radical of the formula



A is a bridge member, R^1 is hydrogen, C_2–C_6-alkenyl, C_1–C_{12}-alkyl which may be interrupted by up to 3 oxygen atoms, unsubstituted or substituted phenylalkyl or C_5–C_7-cycloalkyl and R^2 is a radical of the formula



where R^3 is hydrogen or methyl, R^4, R^5, R^6 and R^7 are each methyl or ethyl and R^8 is hydrogen, C_1–C_8-alkyl, C_3–C_8-alkenyl, C_2–C_4-hydroxyalkyl or aralkyl, and salts of the compound I and.

4,703,073

ALKYLATED N,N-DIBENZYLHYDROXYLAMINES AND POLYOLEFIN COMPOSITIONS STABILIZED THEREWITH

Roland A. E. Winter, Armonk; Ramanathan Ravichandran, Yonkers, and Raymond Seltzer, New City, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 714,647, Mar. 21, 1985, abandoned, which is a continuation-in-part of Ser. No. 633,549, Jul. 23, 1984, Pat. No. 4,590,231, which is a continuation-in-part of Ser. No. 540,732, Oct. 11, 1983, abandoned. This application Sep. 15, 1986, Ser. No. 908,930

Int. Cl.[4] C07C *83/102;* C08K *5/17*

U.S. Cl. 524—99 9 Claims

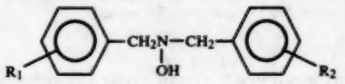
1. A composition, stabilized against discoloration, which comprises

(a) a saturated polyolefin or mixture thereof,

(b) a stabilizing amount of an alkaline metal salt of a fatty acid, or mixture thereof,

(c) a stabilizing amount of a phenolic antioxidant, or mixture thereof, selected from the group consisting of n-octadecyl 3,5-di-tert-butyl-4-hydroxyhydrocinnamate, neopentanetetrayl tetrakis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), di-n-octadecyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate, 1,3,5-tris(3,5-di-tert-butyl-4-hydroxybenzyl)isocyanurate, thiodiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), 1,3,5-trimethyl-2,4,6-tris(3,5-di-tert-butyl-4-hydroxybenzyl)benzene, 3,6-di-oxaoctamethylene bis(3-methyl-5-tert-butyl-4-hydroxyhydrocinnamate), 2,6-di-tert-butyl-p-cresol, 2,2'-ethylidene-bis(4,6-di-tert-butylphenol), 1,3,5-tris(2,6-dimethyl-4-tert-butyl-3- hydroxybenzyl)isocyanurate, 1,1,3-tris(2-methyl-4-hydroxy-5-tert-butylphenyl)butane, 1,3,5-tris[2-(3,5-di-tert-butyl-4-hydroxyhydrocinnamoyloxy)-ethyl]isocyanurate, 3,5-di-(3,5-di-tert-butyl-4-hydroxybenzyl)mesitol, hexamethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), 1-(3,5-di-tert-butyl-4-hydroxyanilino)-3,5-di(octylthio)-s-triazine, N,N'-hexamethylene-bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamide), calcium bis(ethyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate), ethylene bis[3,3-di(3-tert-butyl-4-hydroxyphenyl)butyrate], octyl 3,5-di-tert-butyl-4-hydroxybenzylmercaptoacetate, bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamoyl)hydrazide, and N,N'-bis[2-(3,5-tert-butyl-4-hydroxyhydroxocinnamoyloxy)ethyl]oxamide, and

(d) a stabilizing amount of a hydroxylamine derivative, or a mixture thereof, of formula A



(A)

wherein

R_1 and R_2 are each p-dodecyl or p-alpha, alpha-dimethylbenzyl.

9. The compound which is N,N-bis[p-(alpha-alpha-dimethylbenzyl)benzyl]hydroxylamine.

4,703,074

POLYPHENYLENE SULFIDE RESIN COMPOSITION CONTAINING MIXTURE OF SILICON COMPOUNDS

Hitoshi Izutsu, Kumatori, and Toshihide Yamaguchi, Izumiohtsu, both of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed May 16, 1986, Ser. No. 863,854

Claims priority, application Japan, May 22, 1985, 60-108339

Int. Cl.[4] C08K *5/54*

U.S. Cl. 524—262 9 Claims

1. A polyphenylene sulfide resin composition comprising

(1) a polyphenylene sulfide resin having a melt flow value of at least 1,000 g/min.,

(2) silicic acid, a silicate, or mixture thereof, and

(3) a silane compound composed of (a) a vinyl lane and (b) an aminosilane, an epoxysilane or mixture thereof.

4,703,075

RESINOUS COMPOSITIONS HAVING LUBRICITY

Masaki Egami, Yokkaichi, Japan, assignor to NTN-Rulon Industries Co., Ltd., Tokyo, Japan

Filed Mar. 4, 1986, Ser. No. 835,919

Claims priority, application Japan, Dec. 11, 1985, 60-280669; Dec. 11, 1985, 60-280670; Dec. 11, 1985, 60-280671

Int. Cl.[4] C08K *5/24*

U.S. Cl. 524—269 4 Claims

2. A resinous composition having lubricity, comprising 100 parts by weight of a synthetic resin, 0.5 to 20.0 parts by weight of a first organopolysiloxane having carboxyl modified units, each of said carboxyl modified units containing a carboxyl radical, and 0.5 to 20.0 parts by weight of a second organopolysiloxane having modified units, each of said modified unit containing at least one radical selected from the group consisting of amino radical and alcoholic hydroxyl radical.

4,703,076

COMPOSITION FOR SLIDING MEMBER

Sanae Mori, Nagoya, Japan, assignor to Daido Metal Company Ltd., Nagoya, Japan

Filed May 5, 1986, Ser. No. 859,346

Claims priority, application Japan, May 21, 1985, 60-108576

Int. Cl.[4] C08L *83/00, 67/02;* C08K *3/22, 3/30*

U.S. Cl. 524—420 7 Claims

1. A composition for a sliding member consisting of:

at least one resin in the amount of 0.1 to 50 volume % selected from group (A) consisting of tetrafluoroethylene-perfluoroalkylvinyl ether copolymer resin, tetrafluoroethylene-hexafluoropropylene copolymer resin and fluoroethylene propylene ether resin;

at least one resin in the amount of 0.1 to 50 volume % selected from group (B) consisting of axybenzoylpolyester resin, phenylene sulfide resin, polyimide resin, polyamidoimide resin and silicone resin;

and the balance substantially tetrafluoroethylene resin, the total amount of said constituents other than said tetrafluoroethylene being 0.3 to 70 volume %.

4,703,077

CHEMICAL COMPOSITIONS COMPRISING (1) METHYL METHACRYLATE POLYMER (2) P.E. WAX (3) FAST-EVAPORATING SOLVENT AND (4) SLOW-EVAPORATING SOLVENT

Johannes A. V. Webb, 6th Avenue, Melkbosstrand 7405, South Africa

Filed May 28, 1986, Ser. No. 867,560
Int. Cl.[4] C08K 5/01, 5/02
U.S. Cl. 524—462 7 Claims

1. A chemical composition for use as an anti-glare agent on television screens and glass-covered surfaces comprising:

(a) about 1 to about 10 weight percent of a clear methylmethacrylate polymer;

(b) about 0.1 to about 1 weight percent of a polyethylene wax material capable of being dissolved in a slow-evaporating solvent;

(c) about 80 to about 85 weight percent of a fast-evaporating solvent comprising 1,1,1-trichloro-ethane for said polymer; and

(d) about 13 to about 20 weight percent of a slow-evaporating solvent comprising xylene for said wax material.

4,703,078

POLYOLEFIN-BASED RESIN COMPOSITION

Junichiro Maehara; Kenzo Izumi, and Ikuo Hirokawa, all of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Apr. 23, 1986, Ser. No. 855,145
Claims priority, application Japan, Apr. 30, 1985, 60-93384
Int. Cl.[4] C08K 5/01
U.S. Cl. 524—476 14 Claims

1. A polyolefin-based resin carving composition for forming a carving block which comprises:

(a) 100 parts by weight of a polyolefin-based resin having a viscosity-average molecular weight in the range from 10,000 to 500,000, a specific gravity in the range from 0.88 to 0.99, a melting point in the range from 90° to 160° C. and a melt index in the range from 0.1 to 30 g/10 minutes; and selected from the group consisting of polyethylenes, polypropylenes and copolymers of ethylene and propylene;

(b) from 20 to 300 parts by weight of a wax having a melting point at room temperature or higher and not exceeding the melting point of the polyolefin-based resin; and

(c) from 20 to 300 parts by weight of an oily fluid having a specific gravity in the range from 0.85 to 1.05, a kinematic viscosity in the rnage from 1 to 10,000 centistokes at 40° C. and in the range from 0.3 to 500 centistokes at 100° C. and a pour point at 25° C. or below and being selected from the group consisting of mineral oils and synthetic oils.

4,703,079

CUTTING AND CHIPPING RESISTANT TREAD FOR HEAVY SERVICE PNEUMATIC OFF-THE-ROAD TIRES

Shamim Ahmad, Canal Fulton; Zion S. Lee, Munroe Falls, and Stephen E. Katrenick, Uniontown, all of Ohio, assignors to The B. F. Goodrich Company, New York, N.Y.

Filed Apr. 12, 1985, Ser. No. 722,482
Int. Cl.[4] B60C 11/00, 1/00
U.S. Cl. 524—495 4 Claims

1. A pneumatic tire for off-the-road use, said tire having a tread formed from a silica-free rubber tread compound consisting essentially of 100 parts by weight of a rubber selected from natural rubber, synthetic polyisoprene, and a blend of natural rubber with no more than 25 parts of styrene-butadiene-rubber for 100 parts by wt of total rubber, at least 55 phr of a high structure, fine particle carbon black, designated N103, having a CTAB from 130–150 m^2/g, N_2 adsorption of 140–160 m^2/g, a tint of 125–140%, a DBPA of 120–140 ml/100 g, and a mean particle diameter of about 24 nanometers; and, from about 4 to about 8 phr of processing oil, antioxidant/antiozonants, curing agents and activators each present in an amount less than 10 phr.

4,703,080

AQUEOUS LATICES HAVING IMPROVED COATING RHEOLOGY

Gregory D. Shay, Oak Forest; James E. Devona, Mt. Prospect, and James E. Kail, Arlington Hgts., all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Apr. 29, 1985, Ser. No. 728,087
Int. Cl.[4] C08L 39/00
U.S. Cl. 524—555 15 Claims

1. A latex paint containing, as the resin binder component of said paint, an aqueous emulsion copolymer of monoethylenically unsaturated monomers which provide a copolymer having a glass transition temperature below 20° C., and which include from about 0.3% to about 10% of a monoethylenically unsaturated copolymerizable polyether containing a chain of from about 6 to about 150 C_2–C_4 oxyalkylene groups, said chain of oxyalkylene groups being linked to a monofunctional hydrophobic group containing a C_6 to C_{30} hydrocarbon group, and said monofunctional hydrophobic group being linked to said chain of oxyalkylene groups by means of a group selected from an ether group, an ester group and a urethane group.

4,703,081

POLY(ARYLENE SULFIDE) RESIN TERNARY BLENDS

Jennings P. Blackwell, and William H. Beever, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 8, 1986, Ser. No. 849,608
Int. Cl.[4] C08K 61/00
U.S. Cl. 524—592 13 Claims

1. A polymer composition comprising:

(a) a poly(arylene sulfide) resin present in an amount of about 10 to 90 weight percent based on the total weight of the polymer composition;

(b) a poly(amide-imide) resin present in an amount of 10 to 40 weight percent based on the total weight of the polymer composition; and

(c) at least one resin selected from the group consisting of a poly(aryl ketone) resin and a poly(aryl sulfone) resin present in an amount of about 5 to 80 weight percent based on the total weight of the polymer composition.

4,703,082

INTEGRAL ADDITIVES AND METHODS FOR MAKING FILLED THERMOPLASTICS

Robert E. Godlewski, Mahopac, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Aug. 27, 1981, Ser. No. 295,812
Int. Cl.[4] C09K 11/07
U.S. Cl. 524—731 8 Claims

1. An integral additive for improving the physical properties of thermoplastic organic polymer filled with inorganic fillers comprising a mixture of (1) a polymerizable unsaturated silicon compound having one to five silicon atoms interconnected by ≡SiOSi≡ linkages when said compound contains more than one silicon atom per molecule, contains at least one silicon-bonded vinyl-polymerizable unsaturated group, and contains at least one silicon-bonded hydrolyzable group when said compound contains one silicon atom per molecule and wherein any valences of silicon not satisfied by oxygen of the ≡Si-OSi≡ linkage, by a silicon-bonded hydrolyzable group or by a silicon-bonded vinyl polymerizable unsaturated group are satisfied by a monovalent hydrocarbon group free of vinyl-polymerizable unsaturation, and/or a polymerizable unsaturated organic compound having at least two polymerizable unsaturated groups and (2) a surfactant comprising: (a) a siloxane containing at least one silicon-bonded alkyl group having at least 12 carbon atoms.

4,703,083

GRAFTED NITRILE RUBBER BLENDS AS THERMOPLASTIC ELASTOMERS

Claudio Giori, Riverwoods, and Stamatios G. Mylonakis, Barrington, both of Ill., assignors to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Filed May 28, 1986, Ser. No. 867,714
Int. Cl.[4] C08L 9/02, 51/04
U.S. Cl. 525—87 6 Claims

1. A thermoplastic composition comprising 100 parts by weight of a graft copolymer and from 20 to 50 parts by weight of a low gel nitrile rubber, wherein said low gel nitrile rubber is a copolymer of from 80 to 60 wt % of a 1,3-diene and from 20 to 40 wt % acrylonitrile, having a gel content less than 50% and wherein the graft copolymer comprises:

(a) from 10 to 100 parts by weight of a mixture of graft polymerizable vinyl aromatic compounds selected from the group consisting of styrene, alpha methylstyrene, vinyltoluene and mixtures thereof, and vinyl nitrile compounds selected from the group consisting of acrylonitrile, methacrylonitrile and mixtures thereof, said mixture graft copolymerized in the presence of

(b) 100 parts by weight of a preformed, high gel diene-nitrile copolymer, comprising from 5 to 25 wt % of acrylonitrile and correspondingly from 95 to 75 wt % of a 1,3-diene, having a gel content greater than 80%.

4,703,084

THERMOPLASTIC COMPOSITIONS CONTAINING NITRILE RUBBER

Claudio Giori, Riverwoods, and Stamatios G. Mylonakis, Barrington, both of Ill., assignors to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Filed May 28, 1986, Ser. No. 867,721
Int. Cl.[4] C08L 9/00, 9/02, 51/04
U.S. Cl. 525—87 4 Claims

1. A thermoplastic composition comprising:

(A) from 10 to 50 parts by weight of a copolymer of from 85 to 50 wt % of a vinyl aromatic monomer and correspondingly from about 15 to 50 wt % acrylonitrile,

(B) from 50 to 90 parts by weight of a first nitrile rubber, and

(C) from 10 to 50 parts by weight of a graft copolymer prepared by graft polymerizing from 10 to 50 parts by weight of a mixture comprising from 85 to 15 wt % of a vinyl aromatic compound and correspondingly from 15 to 50 wt % acrylonitrile in the presence of 100 parts by weight of a second nitrile rubber,

wherein said first and second nitrile rubbers are copolymers comprising from 15 to 50 wt % acrylonitrile and correspondingly from 85 to 50 wt % butadiene.

4,703,085

IMPACT MODIFIER FOR IMIDE CONTAINING COPOLYMERS

Barry D. Dean, Broomall, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 14, 1986, Ser. No. 895,990
Int. Cl.[4] C08L 53/00
U.S. Cl. 525—91 19 Claims

1. A method of enhancing the impact strength properties of a thermoplastic composition comprising at least one copolymer having recurring units of an imide monomer bearing an active hydrogen having a pKa value from about 4 to about 11 upon molding, the method comprising introducing into said composition an A-B-A triblock copolymer wherein each A separately represents poly(2-alkyl-2-oxazoline) end blocks and B represents polyisobutylene midblock, the A-B-A triblock copolymer being employed in an effective amount to improve the impact strength properties of the composition upon molding as compared to the impact strength properties of the composition in the absence of the A-B-A triblock copolymer.

4,703,086

FIBER-REINFORCED RUBBER COMPOSITION AND PRODUCTION PROCESS THEREOF AND FIBER-REINFORCED ELASTIC PRODUCT

Shinji Yamamoto, Yotsukaido; Koubei Kaijiri, Chiba; Kouichi Nagakura; Denichi Oda, both of Ichihara; Yasuo Matsumori, Ube, and Kimio Nakayama, Ichihara, all of Japan, assignors to UBE Industries, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 439,176, Nov. 4, 1982, abandoned. This application Oct. 21, 1985, Ser. No. 788,524
Claims priority, application Japan, Nov. 5, 1981, 56-176428; Feb. 9, 1982, 57-18185; Sep. 2, 1982, 57-151687
Int. Cl.[4] C08F 8/30; C08L 75/00
U.S. Cl. 525—133 9 Claims

1. A process for producing a fiber-reinforced rubber composition comprising the steps of:

mixing vulcanizable rubber, fiber-forming polyamide having

groups and having a number-average molecular weight of less than 200,000 and 0.2 to 2.5 parts by weight, based on 100 parts by weight of the total amount of the rubber and the polyamide, of a resol type alkylphenol formaldehyde resin precondensate together at a temperature of not less than the melting point of the polyamide, but not more than 270° C.;

adding additional vulcanizable rubber in a quantity such that the amount of polyamide in the resultant mixture is within a range of 1 to 70 parts by weight based on 100 parts by weight of the vulcanizable rubber and further mixing the resultant mixture at a temperature of not less than the melting point of the polyamide, but not more than 270° C.;

extruding the mixture from an extruder at a temperature of not less than the melting point of the polyamide, but not more than 270° C.; and

drawing an extrudate at a temperature of less than the melting point of the polyamide.

4,703,087

WATER-SOLUBLE POLYMERS AND THEIR USE AS AUXILIARIES FOR BUILDING MATERIALS

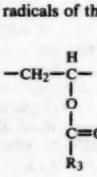
Werner Lange, Visselhövede; Frank Höhl, Neuenkirchen, and Klaus Szablikowski, Walsrode, all of Fed. Rep. of Germany, assignors to Wolff Walsrode AG, Walsrode, Fed. Rep. of Germany

Filed Dec. 16, 1986, Ser. No. 942,142
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545596
Int. Cl.[4] C08F 82/80
U.S. Cl. 525—161 3 Claims

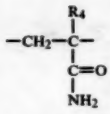
1. Water-soluble copolymers consisting of

(1) 5 to 50 mol % of radicals of the formula I

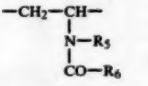
(2) 0 to 20 mol % of radicals of the formula II



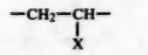
(3) 5 to 50 mol % of radicals of the formula III



(4) 5 to 50 mol % of radicals of the formula IVa or IVb

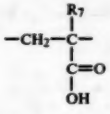


(IVa)



(IVb)

(5) 2 to 50 mol % of radicals of the formula V



wherein, in the radicals I to V,

R_1 denotes hydrogen or a methyl group,

R_2 denotes an alkoxycarbonyl group with 1 to 4 C atoms in the alkoxy group, an alkanoyloxy group with 1 to 4 C atoms or a β-hydroxyalkoxycarbonyl with 2 or 3 atoms,

R_3 denotes a methyl or an ethyl group,

R_4 denotes hydrogen or a methyl group,

R_5 and R_6, the same or different, denoting hydrogen, a methyl or ethyl group or a common trimethylene or pentamethylene ring,

R_7 denoting hydrogen or a methyl group, and

X denotes an imidazole or carbazole radical in the radicals I to V it being necessary for the sum of (1) to (5) always to give 100 mol %.

4,703,088

MOLD CORROSION INHIBITORS

Dale O. Tieszen, and James S. Dix, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 18, 1981, Ser. No. 332,282

The portion of the term of this patent subsequent to Jul. 9, 2002, has been disclaimed.

Int. Cl.[4] C08L *81/00*

U.S. Cl. 525—189 **19 Claims**

1. A composition comprising poly(arylene suliide) and a corrosion inhibitor selected from the group consisting of polyamide, polyacrylamide, ionic derivatives of said polyacrylamide, and mixtures thereof; wherein the weight ratio of corrosion inhibitor to poly(arylene sulfide) is within the range of about 0.7:100 to about 1:100.

4,703,089

STRUCTURAL ADHESIVE FORMULATIONS

Dennis J. Damico, 4878 Old Sterrettania Rd., Erie, Pa. 16506

Filed Apr. 10, 1984, Ser. No. 598,736

Int. Cl.[4] C08F *279/02, 283/04*

U.S. Cl. 525—245 **4 Claims**

1. An ambient temperature-curable adhesive composition consisting essentially of, in admixture

(A) at least one liquid olefinically unsaturated monomer;

(B) at least one polymeric material selected from the group consisiting of

(1) at least one olefinically unsaturated urethane reaction product of at least one isocyanate functional prepolymer and at least one hydroxy-functional monomer having at least one unit of polymerizable olefinic unsaturation, such reaction product being characterized by the presence of at least two units of olefinic unsaturation and the substantial absence of free isocyanate groups;

(2) at least one butadiene-based elastomeric polymeric material selected from the group consisting of

(a) homopolymer of butadiene;

(b) copolymer of butadiene and at least one monomer copolymerizable therewith selected from the group consisting of styrene, acrylonitrile, methacrylonitrile and mixtures thereof;

(c) modified elastomeric polymeric material selected from the group consisting of butadiene homopolymer and copolymer as previously defined, such homopolymer and copolymer having been modified by copolymerization therein by trace amounts up to 5 percent by weight, based on weight of modified elastomeric material, of at least one functional monomer; and

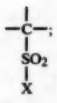
(d) mixtures thereof;

(3) at least one homopolymer of copolymer of at least one olefinically unsaturated monomer selected from the group consisting of styrene and alkyl or hydroxyalkyl esters of acrylic and methacrylic acid, said ester having one to 18 carbon atoms in the alkyl moiety; and

(4) mixtures of such polymeric materials;

(C) a Bronsted acid compound having at least one organic or inorganic acid group and a pKa in the range from 0.5 to 6;

(D) at least one compound containing at least one sulfonyl halide group having the structure



wherein X is selected from the group consisting of chlorine, bromine, or iodine; and

(E) at least one reducible compound containing at least one metal selected from the elements of classes Ib, IIb, IIIb, IVb, Vb, VIb, VIIb or VIII on the periodic chart of the elements.

4,703,090

METHOD FOR THE PREPARATION OF GRAFT COPOLYMERS BY EMULSION COPOLYMERIZATION

Andrea Ferraresi, and Pierluigi Griselli, both of Ferrara, Italy, assignors to Enichem Polimeri S.p.A., Sassari, Italy

Filed Dec. 9, 1985, Ser. No. 806,974

Claims priority, application Italy, Dec. 18, 1984, 24113 A/84

Int. Cl.[4] C08F *279/04*

U.S. Cl. 525—246 **17 Claims**

1. An emulsion polymerization process for the preparation of grafted polymers comprising:

(a) in a first stage of the process, charging a reaction space with a monomodal polybutadiene latex having a particle diameter of from 800 to 2500 Angstroms in an amount from 80 to 90% of the total polybutandiene latex employed in the entire process;

(b) continuously feeding said reaction space with monomers of styrene and acrylonitrile in a weight ratio of from 60:40 to 80:20 at a temperature of from 50° to 80° C. in the presence of an initiator until 70 to 90% of said monomers react with said polybutadiene latex to form the grafted polymer; and

(c) in a second stage of the process, feeding to the grafted polymer of the first stage the remaining amount of the polybutadiene latex and an additional amount of said monomers of styrene and acrylonitrile at a temperature of 50°–80° C. in the presence of initiator until 94–96% of the

monomers have reacted with the polybutadiene latex to form said grafted polymer.

4,703,091

HALOGENATED BUTYL RUBBER

Irwin J. Gardner, Scotch Plains; James V. Fusco, Red Bank; Neil F. Newman, Edison; Ronald C. Kowalski, New Providence; William M. Davis, Edison, all of N.J., and Francis P. Baldwin, Coupeville, Wash., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 597,187, Apr. 5, 1984, Pat. No. 4,632,963. This application Nov. 21, 1986, Ser. No. 933,655

Int. Cl.[4] C08F *8/20*

U.S. Cl. 525—332.3 **8 Claims**

1. A method for improving the adhesion of a halogenated butyl rubber composition to a tire carcass which comprises incorporating into said composition as the halogenated butyl rubber, an improved halogenated butyl rubber having a conjugated diene unsaturation content of less than 0.25 mole %, a halogen content of at least 0.6 wt. %, and at least 20 mole % of the halogen being in a primary allylic configuration.

4,703,092

PROCESS OF MAKING N-(2-HYDROXY-3-SULFOPROPYL) AMIDE CONTAINING POLYMERS

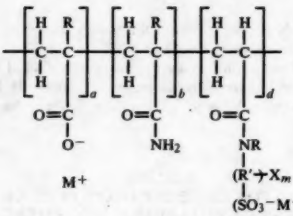
Dodd W. Fong, Naperville, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Continuation of Ser. No. 796,451, Nov. 8, 1985, abandoned. This application Jan. 30, 1987, Ser. No. 9,563

Int. Cl.[4] C08F *8/34*

U.S. Cl. 525—351 **8 Claims**

1. A process to synthesize water-soluble sulfonated polymers having randomly repeated mer units represented by the formula:



wherein

R is individually chosen at each occurrence from H and lower alkyl (C_1–C_4) groups; M is chosen from hydrogen, alkali metal, alkaline earth metal, tertiary amines, and ammonium ion, and mixtures thereof:

R′ is a multi-covalent hydrocarbonaceous briding group having from one to sixteen carbon atoms and being chosen from bridging groups which are linear alkyl, branched alkyl, cyclic, aromatic, olefinic and mixtures thereof;

X is OH;

and wherein

a, b, and d are integers with following relationships;

a/b is from zero to 100

b/d is from 0.01 to 100

a/d is from zero to 100,

and the sum of a+b+d is sufficient to provide a molecular weight of at least 1000, and the ratio of d:(a+b) is from 20:1 to 1:100;

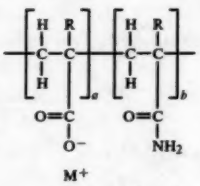
and wherein

m ranges between 0 and 16, and

n ranges between 1 and 16, provided that when m is zero,

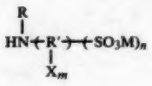
R′ is a bridging group from linear alkyl, cyclic, olefinic "," aromatic, and mixtures thereof, and further provided that the sum of m+n is from 1 to 20; which process comprises reacting, in a common solvent, at a temperature of at least 100° C.;

A. a polymer having a molecular weight of at least 500, and having pendant amine functional groups, and represented by the structure:



wherein R, M, a, and b have the same meanings as above; with

B. a chemical reactant having the structure:



wherein R, R′, M, X, m, and n have the meanings above; and wherein the mole ratio of chemical reactant to pendant amide groups in the polymer ranges between about 5:1 to about 1:100; and reacting at the amide nitrogen group for an effective amount of time to accomplish at least a 25 percent conversion of chemical reactant to sulfonated pendant groups on the polymer; and then recovering the water-soluble sulfonated polymer.

4,703,093

METHOD OF PREPARING A POLYMER FOR CROSS-LINK ROTATIONAL MOLDING AND A POLYMER PREPARED BY SAID METHOD

Glenn A. Thurman, Dyersburg, Tenn., assignor to Colonial Rubber Works, Inc., Dyersburg, Tenn.

Filed Jan. 16, 1985, Ser. No. 692,098

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—387 **10 Claims**

1. In a method of preparing a polymer for rotational molding by grinding a polymer selected from the goup consisting of low density polyethylene, linear low density polyethylene, high density polyethylene, polypropylene, and copolymers thereof and mixing said polymer with an organic peroxide curing agent, the improvement comprising the steps of: grinding said polymer to produce polymer particles of a size suitable for rotational molding, heating said particles to a temperature below their melting point, contacting and blending said ground polymer particles with a curing agent at a temperature below the melting point of said polymer and below the activation temperature of said curing agent and drying and cooling said ground polymer particles to a free-flowing powder.

4,703,094

POLYMERIZATION IN SEVERAL STAGES OF ALPHA-OLEFINS IN THE GAS PHASE

Charles Raufast, Saint Julien Les Martigues, France, assignor to BP Chemicals Limited, London, England

Filed Feb. 12, 1986, Ser. No. 828,966

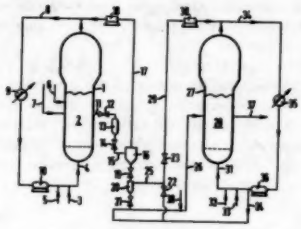
Claims priority, application France, Feb. 19, 1985, 85 02345

Int. Cl.[4] C08F *2/34, 10/00*

U.S. Cl. 526—65 **9 Claims**

1. Process for polymerisation of alpha-olefins in the gas phase under low pressure in successive stages, in at least two separate polymerisation reactors interconnected by a transfer device, the process comprising introducing into a first

polymerisation reactor, a reaction gas mixture comprising one or more alpha-olefins, and a catalyst system or a catalyst, polymerising the alpha-olefins in the gas phase in the first polymerisation reactor, withdrawing from this first reactor the resultant polyolefin powder accompanied by reaction gas mixture, and transferring said powder by means of the transfer device into a second gas phase polymerisation reactor, introducing into this second reactor a reaction gas mixture comprising one or more alpha-olefins, which mixture is identical to or different from that of the first reactor, and polymerising the alpha-olefin or alpha-olefins in the gas phase in the second polymerisation reactor, and when more than two reactors are used repeating the operations of withdrawal from the second reactor and of transfer of the polyolefin powder to a third reactor and so on as far the last reactor, this process being characterised in that the polyolefin powder accompanied by



reaction gas mixture withdrawn from a polymerisation reactor, is subjected prior to being transferred into the following polymerisation reactor:

(a) firstly, to a decompression stage comprising lowering the pressure of this gas mixture to a pressure from 1/50 to 1/5 of the pressure existing in the polymerisation reactor from which the powder is withdrawn, and separating the polyolefin powder from the major part of the decompressed gas mixture,

(b) then, to a compression stage comprising raising the pressure of the polyolefin powder and the residual gas mixture to the pressure of the following polymerisation reactor by means of the reaction gas mixture of this polymerisation reactor, this reaction gas mixture being used at a temperature lower by 20° C. or more than that of this polymerisation reactor.

4,703,095

FLUORINE-CONTAINING COPOLYMER

Shinichi Nakagawa, Nara; Tsuneo Nakagawa, Osaka; Toshihiko Amano, Osaka; Mitsugu Omori, Osaka; Sadaatsu Yamaguchi, Osaka, and Kozo Asano, Osaka, all of Japan, assignors to Daiken Kogyo Co., Ltd., Osaka, Japan

Division of Ser. No. 575,673, Jan. 31, 1984, Pat. No. 4,587,316. This application Feb. 14, 1986, Ser. No. 829,221

Claims priority, application Japan, Feb. 1, 1983, 58-15992

The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.

Int. Cl.[4] C08F *16/24*

U.S. Cl. 526—247 **4 Claims**

1. A fluorine-containing copolymer having good moldability comprising the monomeric units of:

(a) 8 to 15% by weight of hexafluoropropene on the basis of the weight of the copolymer,

(b) 0.2 to 2% by weight of a fluoroalkyl vinyl ether of the formula:

$$CF_2{=}CF{-}O{-}(CF_2)_n{-}CF_2X$$

wherein X is hydrogen or fluorine, and n is an integer of 3 to 9, on the basis of the weight of the copolymer, and

(c) the balance of the copolymer comprises tetrafluoroethylene, said copolymer having a specific melt viscosity of at least 0.5×10^4 poise whereby molded articles such as film derived from said copolymer have improved stress crack resistance and MIT flex resistance.

4,703,096

NOVEL DIACETYLENIC AND POLYDIACETYLENIC COMPOSITIONS

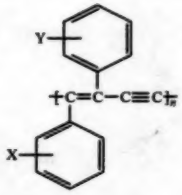
Eui W. Choe, Randolph, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Apr. 21, 1986, Ser. No. 854,273

Int. Cl.[4] C08F *26/00*

U.S. Cl. 526—248 **15 Claims**

1. A polymeric composition which is characterized by the recurring monomeric unit:



where X is an electron-donating substituent; Y is an electron-withdrawing substituent; and n is an integer of at least 3.

4,703,097

OPTICAL CONTACT OBJECTS

Frank Wingler, Leverkusen, and Otto-Christian Geyer, Wetzlar, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 30, 1987, Ser. No. 31,855

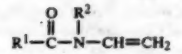
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1986, 3612015; Mar. 14, 1987, 3708308

Int. Cl.[4] C08F *220/26*

U.S. Cl. 526—279 **13 Claims**

1. Optical contact objects fabricated from wettable, optionally crosslinked copolymers of olefinically unsaturated monomers, wherein the copolymer contains as components

(A) 4 to 55 parts by weight of an N-vinylcarboxamide of the formula



in which R^1 and R^2 are the same or different and denote hydrogen or lower alkyl,

(B) 96 to 30 parts by weight of a (meth)acrylate of a polysiloxane, and, optionally

(C) up to 66 parts by weight of a vinyl monomer.

4,703,098

METATHESIS POLYMERIZATION OF THERMALLY OLIGOMERIZED DICYCLOPENTADIENE

Albert S. Matlack, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Feb. 26, 1987, Ser. No. 19,465

Int. Cl.[4] C08F *232/08*

U.S. Cl. 526—283 **3 Claims**

1. A crosslinked copolymer comprising about 40 to 95% by weight, based on total copolymer weight, of repeating units derived from dicyclopentadiene and about 60 to 5% by weight of repeating units derived from higher cyclopentadiene oligomers.

4,703,099

NOVEL PRODUCT AND PROCESS

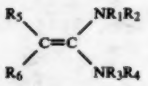
Dale F. Regelman, Wallingford, Conn., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 737,837, May 28, 1985, Pat. No. 4,632,989, which is a division of Ser. No. 587,429, Mar. 8, 1984, Pat. No. 4,536,490. This application Sep. 22, 1986, Ser. No. 909,543

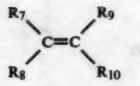
Int. Cl.[4] C08G 18/08

U.S. Cl. 528—54 10 Claims

1. In a method for the trimerization of an aromatic polyisocyanate to a polyisocyanurate polymer in the presence of a trimerization catalyst the improvement which comprises employing as said catalyst a composition comprising a solution of the product obtained by reacting, in an inert solvent, substantially equimolar proportions of ketene-aminal and an olefin having the respective formulae (I) and (II)



(I)



(II)

wherein R_1, R_2, R_3, and R_4 when taken separately are independently selected from the group consisting of lower-alkyl, aralkyl, cycloalkyl, and, when taken together as R_1 with R_2 and R_3 with R_4 with the respective nitrogen atoms to which they are attached represent independently heterocyclic groups having 6 or 7 ring atoms, R_5 and R_6 are independently selected from the group consisting of hydrogen, lower-alkyl, aryl, aralkyl, and cycloalkyl, R_7 and R_8 when taken separately are independently selected from the group consisting of hydrogen, lower-alkyl, aryl, aralkyl, and cycloalkyl, provided that R_7 and R_8 are not both hydrogen at the same time, and, R_7 and R_8, when taken together with the carbon atom to which they are attached represent a cyclic hydrocarbon group having 5 or 6 carbon atoms in the ring, and R_9 and R_{10} represent the same or different electron withdrawing groups.

4,703,100

PROCESS FOR THE PRODUCTION OF POLYISOCYANATES CONTAINING UREA AND/OR BIURET GROUPS, PREPARATIONS OBTAINABLE THEREBY AND THEIR USE

Werner Rasshofer, Cologne; Reiner Paul, Mülheim-Ruhr; Klaus Seel, Cologne, and Christian Weber, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 855,296

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516730

Int. Cl.[4] C08G 18/10, 18/32; C08J 9/00

U.S. Cl. 528—66 14 Claims

1. A urea- and/or biuret-modified polyisocyanate having an NCO-content of about 0.7 to 45% by weight which is prepared by reacting

(A) at least one organic polyisocyanate having an NCO content of about 10 to 50% by weight with

(B) organic compounds containing isocyanate-reactive groups comprising

(a) a polyether or polyester having a molecular weight of 500 to about 20,000 and containing at least two isocyanate-reactive groups comprising a member selected from the group consisting of alcoholic hydroxyl groups attached to primary carbon atoms, alcoholic hydroxyl groups attached to secondary carbon atoms, aromatically bound primary amino groups, aromatically bound secondary amino groups, cycloaliphatically bound primary amino groups, cycloaliphatically bound secondary amino groups, aliphatically bound primary amino groups, aliphatically bound secondary amino groups and mixtures thereof, and

(b) a low molecular weight organic compound comprising

(1) an aromatic diamine or triamine having a molecular weight of 108 to 499 and containing primary and/or secondary amino groups,

(3) an aliphatic or cycloaliphatic diamine or triamine having a molecular weight of 60 to 499 and containing primary and/or secondary amino groups,

(3) an organic compound having a molecular weight of 61 to 499 and containing at least one alcoholic hydroxyl group attached to a primary or secondary carbon atom and at least one aliphatically-, cycloaliphatically- or aromatically-bound primary or secondary amino group,

(4) a compound containing at least two alcoholic hydroxyl groups and optionally at least one ether or ester group and

(5) mixtures of (1) to (4),

wherein the equivalent ratio of isocyanate groups in component (A) to isocyanate-reactive groups in component (B) is about 2:1 to 100:1, the equivalent ratio of isocyanate-reactive groups in component (a) to component (b) is about 100:1 to 0.1:1 and at least 25% of the isocyanate-reactive groups in components (a) and (b) are primary or secondary amino groups.

4,703,101

LIQUID CROSSLINKABLE COMPOSITIONS USING POLYEPOXIDES AND POLYACIDS

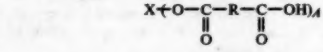
Debra L. Singer, Pittsburgh; Rostyslaw Dowbenko, Gibsonia, and Dennis A. Simpson, Koppel, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 19, 1985, Ser. No. 767,019

Int. Cl.[4] C08G 63/42

U.S. Cl. 528—87 11 Claims

1. A liquid crosslinkable composition which comprises an epoxy-containing acrylic polymer which is a copolymer of an ethylenically unsaturated monomer having at least one epoxy group selected from the class consisting of glycidyl acrylate, glycidyl methacrylate and allyl glycidyl ether and at least one polymerizable ethylenically unsaturated monomer which is free of epoxy groups and a polyacid curing agent of the structure:



where X is the residue of a polyol after reaction with a 1,2-dicarboxylic acid anhydride, containing from 2 to 30 carbon atoms exclusive of carbon atoms in the anhydride moiety, R is an organic moiety associated with the anhydride, and A is equal to at least 2.

4,703,102

AROMATIC POLYETHER KETONES

Shinsuke Fukuoka, Kurashiki, and Hideki Matsuda, Fuji, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jul. 17, 1985, Ser. No. 756,073

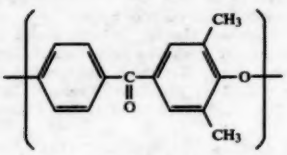
Claims priority, application Japan, Jul. 19, 1984, 59-148600; Jan. 31, 1985, 60-17557

Int. Cl.[4] C08G 8/02, 14/00

U.S. Cl. 528—125 13 Claims

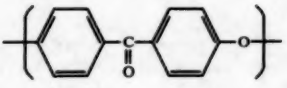
1. An aromatic polyether ketone comprising 5 to 100 mole % of units having the formula:

(A)



and 0 to 95 mole % of units having the formula:

(B)



and having a reduced viscosity of about 0.1 to about 4.0 measured at 30° C. and a concentration of 0.1 g/dl by using 98% by weight sulfuric acid as a solvent.

4,703,103

LIQUID CRYSTALLINE POLYMER COMPOSITIONS, PROCESS AND PRODUCTS

James F. Wolfe, Redwood City, and Paul D. Sybert, Mountain View, both of Calif., assignors to CommTech International, Menlo Park, Calif.

Filed Mar. 16, 1984, Ser. No. 590,292

The portion of the term of this patent subsequent to Aug. 6, 2002, has been disclaimed.

Int. Cl.[4] C08G *75/32, 73/18, 73/22, 78/06*

U.S. Cl. 528—179 **63 Claims**

1. A process for preparing an optically anisotropic liquid crystalline extended chain polymer composition of workable viscosity which is useful in the production of fibers and films comprising the following steps:

(a) incorporating at least one of a selected monomer in a preliminary solvent; and

(b) causing polymerization of said at least one monomer under conditions selected to control the molecular weight of the polymer formed, said conditions including addition of one or more monofunctional reactants in selected amounts and at a selected stage of condensation, offbalancing the stoichiometric proportions of said at least one monomer where said solvent includes at least two monomers, or both;

said steps are conducted within the shaded phosphorus pentoxide content profile area bounded by ABCDEFGHI of FIG. 14.

4,703,104

PREPARATION OF CYANOARYL ETHER COPOLYMER

Shigeru Matsuo; Tomoyoshi Murakami, and Ryuichi Takasawa, all of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Feb. 10, 1986, Ser. No. 828,215

Claims priority, application Japan, Feb. 22, 1985, 60-32741; Mar. 29, 1985, 60-63933

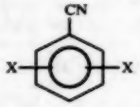
Int. Cl.[4] C08G *65/40*

U.S. Cl. 528—211 **2 Claims**

1. A process for producing a cyanoaryl ether copolymer which comprises the steps of:

(A) reacting dihalogenobenzonitrile represented by the following formula:

(III)



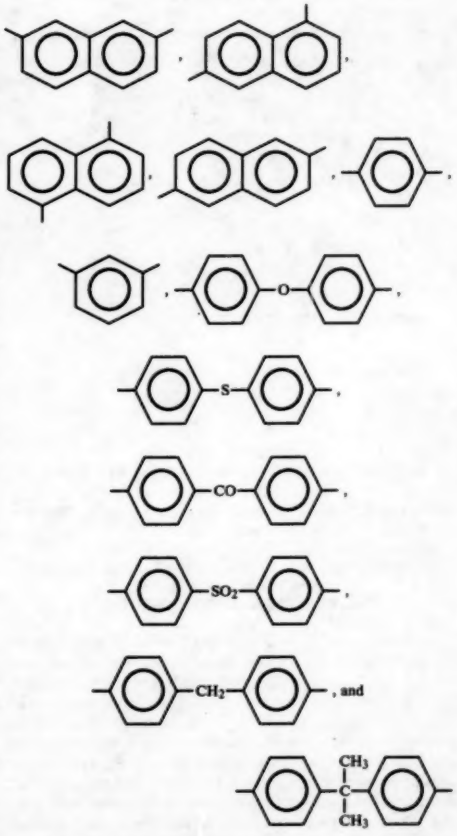
wherein X represents a halogen atom,
an alkali metal salt of a hydroquinone or a dihydroxynaphthalene represented by the formula:

MO—Y—OM (IV)

wherein M represents an alkali metal and Y represents a phenylene group or a naphthylene group,
and an alkali metal salt of a divalent phenol represented by the following formula:

MO—Ar—OM (V)

wherein M represents an alkali metal and Ar is different from Y and represents a divalent group selected from the group consisting of:

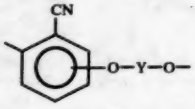


with the amount of the compound represented by the formula (IV) to the total amount of the compounds represented by the formulae (IV) and (V) being 0.5 to 0.97 in

terms of molar ratio, provided that when one of Y and Ar represents the phenylene group and the other represents the naphthylene group, the amount of the compound represented by the formula (IV) to the total amount of the compounds represented by the formulae (IV) and (V) being 0.03 to 0.97, and the moles of the compound represented by the formula (III) being equal to or slightly in excess of the total moles of the compounds represented by the formulae (IV) and (V), in the presence of a solvent and at 100° to 350° C., and

(B) treating the obtained reaction product with water or an alcohol;

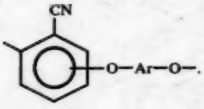
said copolymer has a reduced viscosity [$\eta_{sp/c}$] of 0.3 dl/g or higher as measured in p-chlorophenol solution at a concentration of 0.2 g/dl at 60° C. and comprises a recurring unit represented by the formula:



(I)

wherein Y represents a phenylene group or a naphthylene group,

and a recurring unit represented by the formula:



(II)

4,703,105

EXTRACTION OF RESIDUES FROM STYRENIC POLYMERS

Sambasiva R. Aliada, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 23, 1985, Ser. No. 812,440

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] C08F *6/00, 6/28*; C08J *3/00*

U.S. Cl. 528—483 **9 Claims**

1. A method of making products formed of thermoplastic styrenic polymer comprising bringing molten polymerizate having acrylonitrile polymerized with styrene into contact with a solvent gas extractant having a critical temperature within the range of from 210° C. below to 20° C. above the process temperature or temperature at which the residual free styrene monomer can be extracted and at a pressure above the critical pressure of the solvent gas, separating the extractant and thereafter forming the polymerizate into packaging material; whereby depolymerization and decomposition is substantially inhibited; other residual monomers, oligomers, solvents, diluents and volatile condensation by-products are substantially reduced; and the need for chemical scavengers is negated.

4,703,106

NOVEL POLYPEPTIDE AND PROCESS FOR PRODUCING THE SAME

Sachio Hirose; Tammotsu Homma; Takashi Kurihara, all of Ami; Hidenari Adachi; Yoshitaka Sako, both of Osaka, and Makiko Shibata, Ibaragi, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd.; Mitsubishi Chemical Industries, Ltd., both of Tokyo and Sanyo Fine Co., Ltd., Okayama, all of, Japan

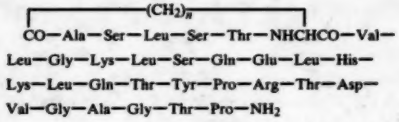
Filed Nov. 4, 1985, Ser. No. 794,644

Claims priority, application Japan, Nov. 6, 1984, 59-232478

Int. Cl.[4] C07K *7/36*

U.S. Cl. 530—307 **3 Claims**

1. A novel polypeptide having the formula:



wherein Ala represents alanine, Ser serine, Leu leucine, Thr threonine, Val valine, Gly glycine, Lys lysine, Gln glutamine, arginine, Asp aspartic acid, and n represents an integer of 3 to 7.

4,703,107

WATER-SOLUBLE ACYLATED DERIVATIVES OF PEPTIDES OR AMINO ACIDS, THEIR PREPARATION AND THEIR USE

Michel Monsigny, Saint Cyr En Val, and Roger Mayer, Orleans, both of France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France

Continuation-in-part of Ser. No. 610,112, May 14, 1984, abandoned. This application Dec. 3, 1985, Ser. No. 804,115

Claims priority, application France, May 16, 1983, 83 08051

Int. Cl.[4] C07K *7/06, 5/06, 5/08, 5/10*

U.S. Cl. 530—330 **4 Claims**

1. A water-soluble acyl derivative of a peptide having a —CO—X terminal group wherein —X represents a —N-H—R_3 group derived from an aminodrug selected from the group consisting of antibiotics, antitumoral and antiparisitic drugs, said peptide being selected form the group consisting of -L-Phe-, L-Tyr-, -L-Ala-L-Ala-L-Phe-, -Gly-Gly-L-Pro-L-Phe-, -L-Arg-, -L-Lys-, -L-Phe-L-Val-L-Arg-, -L-Pro-L-Phe-L-Arg-, -L-Phe-L-Ser-L-Arg, -L-Val-L-Leu-Gly-L-Arg-, -Gly-L-Pro-L-Arg-, -Gly-L-Pro-L-Lys-, -L-Ala-L-Ala-L-Lys-, -L-Val-L-Leu-L-Lys-, -L-Ile-L-Phe-L-Lys-, -L-Phe-L-Ala-L-Lys-, -L-Ala-Ala-L-Ala-, -L-Ala-L-Ala-L-Pro-L-Val, -L-Ala-L-Ala-L-Pro-L-Ala-, -L-Ala-L-Ala-L-Pro-L-Phe-, -L-Ala-L-Ala-L-Pro-L-Met-, -L-Arg-Gly-L-Phe-L-Pro-, -L-Arg-L-Phe-L-Pro, -L-Ala-L-Arg-L-Arg-, -L-Phe-L-Leu-L-Phe-, -Gly-Gly-L-Leu-, -Gly-L-Pro-L-Ala-Gly-L-Pro-, -L-Pro-L-Ala-Gly-L-Pro-, -Gly-Gly-L-Arg-, -L-Phe-Gly-Gly-L-Arg-, -L-Ile-Gly-Gly-L-Arg-, -L-Val-L-Leu-Gly-L-Lys-, -L-Ser-Gly-L-Lys-, -L-Ile-L-Leu-L-Arg-, -L-Ile-L-Leu-L-Lys-, -L-Ile-L-Phe-L-Arg-, -L-Val-L-Leu-L-Arg-, -L-Val-L-Phe-L-Arg-, -L-Val-L-Phe-L-Lys-, -Gly-L-Val-L-Phe-L-Arg-, -Gly-L-Val-L-Phe-L-Lys- and -Gly-L-Ile-L-Phe-L-Lys, the N-terminal group of said peptide being acylated by a polyhydroxyalkanol selected from the group consisting of erythrononyl, threonoyl, ribononyl, arabinonyl, xylonoyl, lyxonoyl, gluconoyl, galactonoyl, mannonoyl, glycoheptonoyl and glycooctonoyl.

4,703,108

BIODEGRADABLE MATRIX AND METHODS FOR PRODUCING SAME

Frederick A. Silver, Long Valley; Richard A. Berg, Lambertville; David E. Birk, Somerset; Kevin Weadock, Piscataway, and Conrad Whyne, Somerset, all of N.J., assignors to University of Medicine & Dentistry of New Jersey, Newark, N.J.

Continuation of Ser. No. 593,733, Mar. 27, 1984, abandoned. This application Mar. 26, 1986, Ser. No. 843,828

Int. Cl.[4] A23J 1/10; C08H 1/06

U.S. Cl. 530—356 38 Claims

1. The process for the preparation of a cross-linked collagen matrix which comprises two cross-linking steps of:

(a) contacting collagen with a cross-linking agent selected from the group consisting of a carbodiimide and a combination of a bifunctional succinimidyl active ester and a carbodiimide, and

(b) subjecting collagen to elevated temperatures under vacuum.

4,703,109

TRICYCLOPENTADIENYL CERIUM AND PROCESS FOR PREPARING THE SAME

Peter S. Gradeff, Pottersville, and Fred G. Schreiber, Highland Park, both of N.J., assignors to Rhone-Poulenc, Inc., New Brunswick, N.J.

Continuation-in-part of Ser. No. 604,756, Apr. 27, 1984, Pat. No. 4,492,655. This application Nov. 26, 1984, Ser. No. 674,639

The portion of the term of this patent subsequent to Jan. 8, 2002, has been disclaimed.

Int. Cl.[4] C07F 17/00

U.S. Cl. 534—15 10 Claims

1. A process for preparing tricyclopentadienyl cerium, which comprises reacting an alkali metal cyclopentadienide with ceric ammonium nitrate in solution in an inert organic solvent until tricyclopentadienyl cerium is formed.

4,703,110

BENZOIC ACID DERIVATIVES HAVING A PARA SUBSTITUENT WHICH IS A SUBSTITUTED PHENYL GROUP CONNECTED BY A LINKING RADICAL; USEFUL IN NEOPLASTIC CELL DIFFERENTIATION AND DIAGNOSIS

Koichi Shudo, 2-25, 6-102, Higashiyama, Meguroku Tokyo, Japan, assignor to Koichi Shudo, Tokyo, Japan

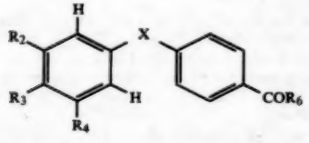
Filed Jul. 8, 1985, Ser. No. 753,036

Claims priority, application Japan, Jul. 7, 1984, 59-141194; Sep. 19, 1984, 59-197089

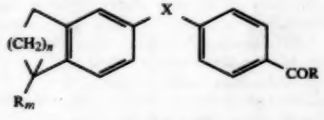
Int. Cl.[4] C07C 63/06, 69/78, 105/00, 107/06

U.S. Cl. 534—566 6 Claims

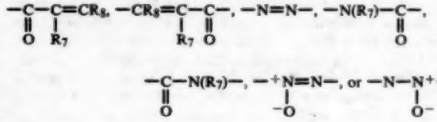
1. A benzoic acid derivative represented by a formula selected from the group consisting of



and



wherein R means a lower-alkyl group, n is 1–3, and m is 1–5, and wherein R_2, R_3 and R_4 are the same or different and each represents hydrogen or middle alkyl of C_3–C_7, or cycloalkyl having 3–7 atoms, with the proviso that only one can be hydrogen at one time, R_6 represents hydroxyl, lower-alkoxyl, a group of the formula $—NR_7'R_8'$, wherein R_7' and R_8' each represents hydrogen or lower alkyl, and X represents a group of the formula



wherein R_7 and R_8 represent hydrogen or lower-alkyl.

4,703,111

WATER-SOLUBLE COMPOUNDS CONTAINING ONE OR TWO (NITROPHENYLAMINO)-PHENYLAMINO-CHLORO-TRIAZINYLAMINO GROUPS, THE NITROPHENYLAMINO BEING ADDITIONALLY SUBSTITUTED BY A FIBER-REACTIVE GROUP OF THE VINYLSULFONYL SERIES, SUITABLE AS DYESTUFFS

Marcos Segal, and Michael Kunze, both of Hoechst Aktiengesellschaft, P.O. Box 80 03 20, D-6230 Frankfurt am Main 80, Fed. Rep. of Germany

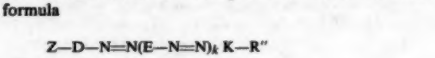
Filed Apr. 7, 1986, Ser. No. 849,066

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517755

Int. Cl.[4] C09B 62/085, 62/09, 62/51, 62/513

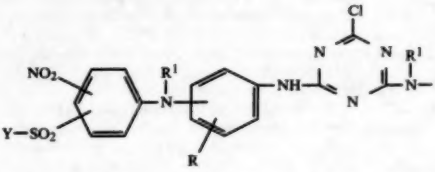
U.S. Cl. 534—637 3 Claims

1. A water-soluble azo compound which conforms to the formula



wherein

Z is a group of the formula



in which

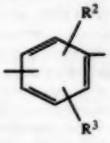
R^1 is hydrogen or is alkyl of 1 to 4 carbon atoms unsubstituted or substituted by one or two substituents selected from the group consisting of acetylamino, hydroxy, sulfato, alkoxy of 1 to 4 carbon atoms, sulfo and carboxy, and both R^1 are identical to or different from each other,

R is hydrogen or sulfo, and

Y is vinyl, β-thiosulfatoethyl, β-phosphatoethyl, β-chloroethyl or β-sulfatoethyl;

k is zero or 1;

D is a group of the formula



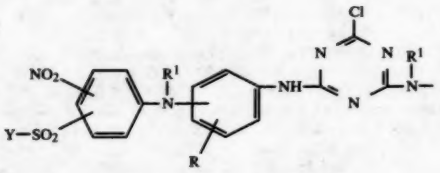
in which

R^2 is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or sulfo and

R^3 is hydrogen or sulfo and the R^2 and R^3 are identical to or different from each other;

E is a phenylene unsubstituted or substituted by one or two substituents selected from the set consisting of 2 alkyls of 1 to 4 carbon atoms; 2 alkoxys of 1 to 4 carbon atoms; 1 chlorine; 1 bromine; 1 alkanoylamino of 2 to 5 carbon atoms, unsubstituted or substituted by substituents selected from the group consisting of chlorine, bromine, sulfo, sulfato, carboxy, hydroxy, carbomethoxy and carbethoxy; 1 benzoylamino; 1 sulfo; 1 carboxy; 1 ureido; 1 phenylureido and 1 alkylsulfonylamino of 1 to 4 carbon atoms; or is a naphthylene unsubstituted or substituted by 1 or 2 sulfo or by $—SO_2Y$ wherein Y is said Y defined above, or by 1 sulfo and said $—SO_2—Y$, each said Y being identical to or different from the other Y;

R″ is hydrogen or a chlorotriazinylamino group of the formula



defined above;

K is, in the case where R″ is the above chlorotriazinylamino group, a 1-hydroxy-naphthylene which contains the azo group bonded in the 2-position, or a 2-hydroxy-naphthylene which contains the azo group bonded in the 1-position, and which are both unsubstituted or substituted by 1 or 2 sulfo, or is a 1,4-naphthylene unsubstituted or substituted by 1 or 2 sulfo, or is a phenylene unsubstituted or substituted by 1 or 2 substituents selected from the group consisting of 2 alkyls of 1 to 4 carbon atoms; 2 alkoxys of 1 to 4 carbon atoms; 2 chlorines; 1 bromine; 1 alkanoylamino of 2 to 5 carbon atoms, unsubstituted or substituted by substituents selected from the group consisting of chlorine, bromine, sulfo, sulfato, carboxy, hydroxy, carbomethoxy and carbethoxy; 1 benzoylamino; 1 sulfo; 1 carboxy; 1 ureido; 1 phenylureido and 1 alkylsulfonylamino of 1 to 4 carbon atoms; or

K—R″ is, if R″ is hydrogen, 1-hydroxy-naphthyl which contains the azo group bonded in the 2-position, or is 2-hydroxynaphthyl which contains the azo group bonded in the 1-position, and both are unsubstituted or substituted by 1 or 2 sulfo by an alkanoylamino of 2 to 5 carbon atoms which is unsubstituted or substituted by substituents selected from the group consisting of chlorine, bromine, sulfo, sulfato, carboxy, hydroxy, carbomethoxy and carbethoxy, or by a benzoylamino which is unsubstituted or substituted by substituents selected from the group consisting of sulfo, carboxy and methyl, or by one or two sulfo and an alkanoylamino group of 2 to 5 carbon atoms which is unsubstituted or substituted by substituents selected from the group consisting of chlorine, bromine, sulfo, sulfato, carboxy, hydroxy, carbomethoxy and carbethoxy, or a benzoylmino which is unsubstituted or substituted by substituents selected from the group consisting of sulfo, carboxy and methyl, or is a phenyl substituted by a monosubstituted or disubstituted amino whose substituents are selected from the group of substituents consisting of alkyl of 1 to 4 carbon atoms, hydroxyalkyl of 1 to 4 carbon atoms, carboxyalkyl of 2 to 5 carbon atoms, sulfoalkyl of 1 to 4 carbon atoms, sulfatoalkyl of 1 to 4 carbon atoms, cyanoalkyl of 2 to 5 carbon atoms, carbalkoxyalkyl having alkyls of 1 to 4 carbon atoms each, phenylalkyl having an alkyl of 1 to 4 carbon atoms, its phenyl being unsubstituted or substituted by substituents selected from the group consisting of methyl, ethyl, methoxy, chlorine, carboxy and sulfo, phenyl and phenyl substituted by substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine, carboxy and sulfo, and which phenyl K—R″ is not additionally substituted or is additionally substituted by 1 or 2 substituents selected from the group consisting of 2 alkyls of 1 to 4 carbon atoms; 2 alkoxys of 1 to 4 carbon atoms; 2 chlorines; 1 bromine; 1 alkanoylamino of 2 to 5 carbon atoms unsubstituted or substituted by substituents selected from the group consisting of chlorine, bromine, sulfo, sulfato, carboxy, hydroxy, carbomethoxy and carbethoxy; 1 benzoylamino; 1 sulfo; 1 carboxy; 1 ureido; 1 phenylureido and 1 alkylsulfonylamino of 1 to 4 carbon atoms.

4,703,112

WATER-SOLUBLE BENZOTHIAZOLE-AZO- AND PHENYL-AZO-COMPOUNDS CONTAINING A 2-SULFO-5-ACYLAMINO-ANILINE COUPLING COMPONENT, SUITABLE AS FIBRE-REACTIVE DYESTUFFS

Peter Mischke, Bad Soden am Taunus, and Ludwig Schläfer, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

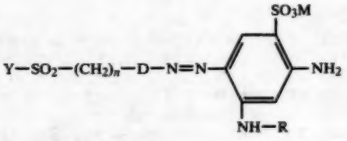
Continuation of Ser. No. 621,142, Jun. 18, 1984, abandoned, which is a continuation of Ser. No. 412,107, Aug. 27, 1982, abandoned. This application Oct. 30, 1986, Ser. No. 926,803

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1981, 3124357

Int. Cl.[4] **C09B** *62/507, 62/51;* **D06P** *1/38, 3/66*

U.S. Cl. 534—642 **15 Claims**

1. A water-soluble azo compound of the formula



in which

D is phenylene unsubstituted or substituted by one or two substituents selected from the group consisting of lower alkyl, lower alkoxy, hydroxy, lower alkanoylamino, benzoylamino, benzoylamino substituted by one or more of lower alkyl, lower alkoxy, chlorine and sulfo, chlorine, bromine, fluorine and carboxy; or

D is phenylene substituted by said one or two substituents and one nitro group; or

D is phenylene substituted by said one or two substituents and a group of the formula $Y—SO_2—(CH_2)_n—$ in which Y is as recited hereinafter and n is 1 or 2; or

D is phenylene substituted by said one or two substituents, one nitro group and said group of the formula $Y—SO_2—(CH_2)_n—$; or

D is benzothiazol-2-yl which contains said group of the formula $Y—SO_2—(CH_2)_n—$ in the carbocyclic ring, and is otherwise unsubstituted or is further substituted in its benzene nucleus by a substituent selected from the group consisting of lower alkyl, lower alkoxy, hydroxy, lower alkanoylamino, benzoylamino, benzoylamino substituted by one or more of lower alkyl, lower alkoxy, chlorine and sulfo, nitro, chlorine, bromine and sulfo;

M is hydrogen or an alkali metal,

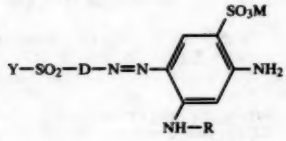
R is lower alkanoyl unsubstituted or substituted by chlorine, bromine, lower alkoxy, phenoxy, phenyl, hydroxy, carboxy or sulfo, or is lower alkenoyl unsubstituted or substituted by chlorine, bromine, carboxy or sulfo, or is lower

alkylsulfonyl unsubstituted or substituted by hydroxy, sulfato, chlorine, bromine or lower alkoxy, or is benzoyl unsubstituted or substituted by substituents selected from the group consisting of chlorine, sulfo, lower alkyl, lower alkoxy, hydroxy and carboxy, or is phenysulfonyl unsubstituted or substituted by substituents selected from the group consisting of lower alkyl, lower alkoxy, chlorine, sulfo and carboxy, or is carbamoyl or carbamoyl monosubstituted or disubstituted at the nitrogen atom by lower alkyl, cycloalkyl and phenyl unsubstituted or substituted by substituents selected from the group consisting of chlorine, sulfo, lower alkyl, lower alkoxy and carboxy, or is vinylsulfonyl, and

Y is vinyl or a group of the formula $—CH_2—CH_2—Z$ in which Z is halogen, lower alkanoyloxy, benzoyloxy, sulfobenzoyloxy, benzenesulfonyloxy, toluenesulfonyloxy, phosphato, sulfato, thiosulfato, lower alkylsulfonylamino, arylsulfonylamino, phenoxy or dialkylamino wherein each alkyl is of from 1 to 4 carbon atoms, and

n is zero, 1 or 2.

13. A water-soluble azo compound of the formula



in which

D is phenylene unsubstituted or substituted by one or two substituents selected from the group consisting of lower alkyl, lower alkoxy and chlorine, or by bromine, or

D is the benzothiazol-2-yl which contains the $Y—SO_2—$ moiety in the carbocyclic ring and is either not substituted in its benzene nucleus by an additional substituent or substituted by a further substituent selected from the group consisting of lower alkyl, lower alkoxy, hydroxy, lower alkanoylamino benzoylamino, benzoylamino substituted by substituents selected from the group consisting of lower alkyl, lower alkoxy, chlorine and sulfo, nitro, chlorine, bromine and sulfo,

M is hydrogen or an alkali metal,

R is lower alkanoyl unsubstituted or substituted by chlorine, bromine, lower alkoxy, phenoxy, phenyl, hydroxy, carboxy or sulfo, or is lower alkenoyl unsubstituted or substituted by chlorine, bromine, carboxy or sulfo, or is lower alkylsulfonyl unsubstituted or substituted by hydroxy, sulfato, chlorine, bromine or lower alkoxy, or is benzoyl unsubstituted or substituted by substituents selected from the group consisting of chlorine, sulfo, lower alkyl, lower alkoxy, hydroxy and carboxy, or is phenylsulfonyl unsubstituted or substituted by substituents selected from the group consisting of lower alkyl, lower alkoxy, chlorine, sulfo and carboxy, or is carbamoyl or carbamoyl monosubstituted or disubstituted at the nitrogen atom by lower alkyl, cycloalkyl and phenyl unsubstituted or substituted by substituents selected from the group consisting of chlorine, sulfo, lower alkyl, lower alkoxy and carboxy, or is vinylsulfonyl, and

Y is vinyl or a group of the formula $—CH_2—CH_2—Z$ in which Z is halogen, lower alkanoyloxy, benzoyloxy, sulfobenzoyloxy, benzenesulfonyloxy, toluenesulfonyloxy, phosphato, sulfato, thiosulfato, lower alkylsulfonylamino, arylsulfonylamino, phenoxy or dialkylamino wherein each alkyl is of from 1 to 4 carbon atoms.

4,703,113

WATER-SOLUBLE TRIAZINE BLACK DYES FREE FROM CELLULOSE REACTIVE GROUPS AND SUITABLE FOR USE IN INKS

Anthony G. W. Baxter, Manchester; Stephen B. Bostock, Bury, and David Greenwood, Oldham, all of England, assignors to Imperial Chemical Industries PLC, London, England

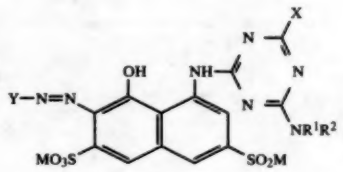
Filed Aug. 12, 1985, Ser. No. 764,999

Claims priority, application United Kingdom, Aug. 24, 1984, 8421551

Int. Cl.[4] C09B *35/38, 35/58, 35/64;* **C09D** *11/02*

U.S. Cl. 534—796 **9 Claims**

1. A water soluble black dye, free from cellulose reactive groups, of the formula:



wherein

R^1 is $—(C_aH_{2a}O)_m(C_bH_{2b}O)_nH$,

R^2 is H or $—(C_aH_{2a}O)_m(C_bH_{2b}O)_nH$, or

R^1 and R^2 together with the nitrogen atom form a morpholine ring

a and b are different and are from 2 to 8

m is from 1 to 10;

n is from 0 to 9;

M is H, ammonium, or a monovalent metal;

X is a monoazo chromophore derived from a benzene or naphthalene diazo component and a benzene, naphthalene or monoheterocyclic coupling component or a bisazo chromophore derived from benzene or naphthalene dizao components and benzene or naphthalene coupling components, in which the monoazo or bisazo chromophore is linked to the triazine group through a group $—NR^5—$ in which R^5 is selected from H, C_{1-4}-alkyl and phenyl; and

Y is a monoazo chromophore derived from a benzene, naphthalene or monoheterocyclic diazo component and a benzene or naphthalene coupling component carrying at least one SO_3M group; provided that the dye contains from three to five azo groups.

4,703,114

POLYETHERS HAVING TERTIARY ALCOHOLIC TERMINALS

Shigeo Mori, Kyoto, and Junichiro Matsumoto, Ohtsu, both of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

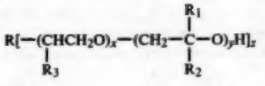
Filed Aug. 9, 1985, Ser. No. 764,042

Claims priority, application Japan, Aug. 9, 1984, 59-167377

Int. Cl.[4] C07G *3/00;* **C07H** *15/04;* **C07C** *43/11, 43/18*

U.S. Cl. 536—4.1 **5 Claims**

1. A polyether of the formula:



wherein:

R is the residue of a compound selected from the group consisting of ethylene glycol, propylene glycol, butylene glycol, hexanediol, glycerine, trimethylol propane, pentaerythritol, sorbitol and sucrose with removal of the active hydrogen atoms thereof,

R_1 is a C_1–C_{10} alkyl or aryl,

R_2 is a C_1–C_{10} alkyl,
R_3 is H, CH_3, C_2H_5 or phenyl,
x is 5–100,
y is 1–5, and
z is 2–8.

4,703,115

PLATINUM COMPLEXES OF DIAMINO-DIDEOXY SUGARS AND DI- OR TRICARBOXYLIC ACIDS

Joseph J. Hlavka, Tuxedo; Ralph G. Child, Pearl River; Panayota Bitha, Pomona, and Yang-i Lin, Nanuet, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

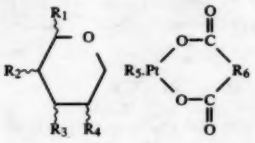
Filed Dec. 17, 1984, Ser. No. 682,884

The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.

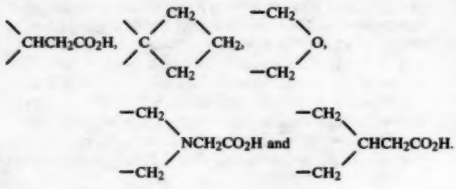
Int. Cl.[4] C07H *17/00;* C07F *15/00*

U.S. Cl. 536—55 8 Claims

1. A compound of the formula:



wherein R_1 is hydrogen, alkyl(C_1–C_3), hydroxymethyl or aminomethyl; R_2, R_3, R_4 and R_5 are each hydroxy or amino with the proviso that at least two of R_2, R_3, R_4 and R_5 must be hydroxy; and R_6 is selected from the group consisting of moieties of the formulae:



4,703,116

POLYSACCHARIDE DERIVATIVES CONTAINING ALDEHYDE GROUPS, THEIR PREPARATION FROM THE CORRESPONDING ACETALS AND USE AS PAPER ADDITIVES

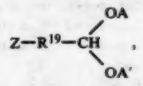
Daniel B. Solarek, Somerville; Patrick G. Jobe, Westfield; Martin M. Tessler, Edison; Robert L. Billmers, Stockton; Diane J. Lamb, Bound Brook, and John J. Tsai, Belle Mead, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 758,634, Jul. 24, 1985, Pat. No. 4,675,394, which is a continuation-in-part of Ser. No. 641,820, Aug. 17, 1984, abandoned. This application Feb. 14, 1986, Ser. No. 829,675

Int. Cl.[4] C08B *31/02, 31/08, 11/04, 37/14*

U.S. Cl. 536—104 34 Claims

1. An aldehyde-containing polysaccharide derivative, which is prepared by hydrolyzing, at a pH of less than 7 an acetal-containing polysaccharide which is prepared by a non-oxidative process which consists of reacting a polysaccharide, at a pH of 10 or above, with an acetal-containing reagent having the general structure



where Z is an organic group capable of reacting with a polysaccharide molecule to form an ether derivative and is selected from the group consisting of an epoxide, a halohydrin, an ethylenically unsaturated group, and a halogen; R^{19} is a divalent organic group containing no starch-reactive substituents; and A and A′ are independently a lower alkyl group or A and A′ together form at least a 5-membered cyclic acetal.

4,703,117

PROCESS FOR ISOLATING MICROBIAL POLYSACCHARIDES FROM THEIR FATTY AMINE ADDUCTS

Edgar Fischer, Frankfurt am Main, and Merten Schlingmann, Königstein/Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 522,610, Aug. 12, 1983, abandoned. This application Oct. 7, 1985, Ser. No. 783,814

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1982, 3230301

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.[4] C08B *37/00;* C12P *19/04, 19/06*

U.S. Cl. 536—114 9 Claims

1. A process for cleaving precipitated fatty amine adducts of microbial polysaccharides containing a carboxy or ester group(s) and for isolating the free microbial polysaccharides containing a carboxy or ester group(s) from said fatty amine adducts, which comprises treating said adducts with at least an equimolar amount of a salt of ammonia or of a highly volatile amine in the presence of an alcohol in which said salt is soluble or readily thermally dissociated.

4,703,118

SYNTHESIS OF 3-IODOMETHYL CEPHALOSPORINS

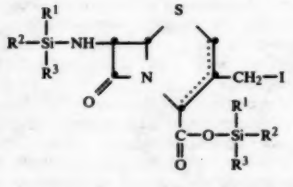
Gary E. Lord, West Lafayette; Robert M. Metzler, and David D. Wirth, both of Lafayette, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 8, 1985, Ser. No. 720,643

Int. Cl.[4] C07D *501/38;* A61K *31/54*

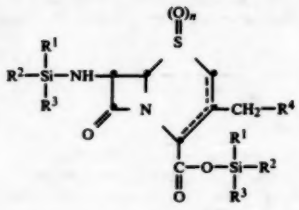
U.S. Cl. 540—224 10 Claims

1. A process for preparing a 3-iodomethyl cephalosporin of the formula



I

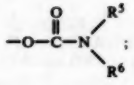
which comprises reacting a compound of the formula



II

with a trialkylsilyl iodide of the formula

in an aprotic solvent under substantially anhydrous conditions at a temperature in the range of about −20° C. to about 35° C., wherein each of R^1, R^2 and R^3 independently is C_1–C_3 alkyl; R^4 is C_1–C_4 alkanoyloxy or a carbamoyloxy group of the formula



each of R^5 and R^6 independently is hydrogen or C_1–C_3 alkyl; and n is 0 or 1.

4,703,119

INTERMEDIATES OF OPTICALLY ACTIVE 1,4-DIHYDROPYRIDINES

Egbert Wehinger, Wuppertal, Fed. Rep. of Germany, and Horst Meyer, West Haven, Conn., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

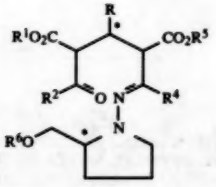
Filed Jun. 4, 1985, Ser. No. 741,099

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1984, 3423105

Int. Cl.⁴ C07D *207/50, 401/12, 403/12, 405/12*

U.S. Cl. 540—544 **2 Claims**

1. A compound of the formula



in which

R represents carbocylic aryl or a heterocylic radical from the group consisting of thienyl, furyl, pyrryl, pyrazolyl, imidazolyl, oxazolyl, isoxazolyl, thiazolyl, pyridyl, pyridazinyl, pyrimidyl, pyrazinyl, indolyl, benzimidazolyl, benzoxazolyl, benzoxadiazolyl, benzothiadiazolyl, quinolyl, isoquinolyl, quinazolyl, and quinoxazolyl, the aryl radical and the heterocyclic radicals optionally containing 1 to 3 identical or different substituents from the group consisting of phenyl, alkyl, cycloalkyl, alkenyl, alkinyl, alkoxy, alkenoxy, alkinoxy, alkylene, dioxyalkylene, halogen, polyfluoroalkyl, polyfluoroalkoxy, alkylamino, dialkylamino, nitro, cyano, azido, alkoxycarbonyl or SO_m-alkyl (m=0 to 2),

R^1 and R^3 are always different and represent an achiral straight-chain, branched or cyclic, saturated or unsaturated hydrocarbon radical, which is optionally interrupted in the chain by an oxygen or sulphur atom, and/or which is optionally substituted by halogen, cyano, alkoxycarbonyl, phenyl, phenoxy, phenylthio or phenylsulphonyl, it being possible for the phenyl groups in turn to be substituted by halogen, cyano, dialkylamino, alkoxy, alkyl, trifluoromethyl or nitro, or it being possible for the hydrocarbon radical to be substituted by pyridyl or an amino group, this amino group being substituted by two identical or different substituents from the group consisting of alkyl, alkoxyalkyl, carbocyclic aryl and aralkyl, or the amino group being substituted such that two substituents, together with the nitrogen atom, form a 5-member to 7-membered ring, which can contain, as a further heteroatom, oxygen or sulphur or an N-alkyl/phenyl grouping,

R^2 and R^4 can be identical or different and each represent hydrogen, an achiral straight-chain or branched, optionally substituted alkyl radical and a carbocyclic aryl radical or a carbocylic aryl radical or a carbocylic aralkyl radical and

R^6 represents an achiral straight-chain or branched alkyl radical with up to 4 carbon atoms or a carbocylic aralkyl radical.

4,703,120

FURO(3,4-D)PYRIMIDINE-2,4-DIONE DERIVATIVES AND INTERMEDIATES THEREOF

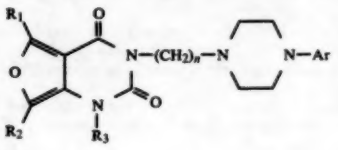
Jeffery B. Press, Rocky Hill, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Apr. 28, 1986, Ser. No. 856,561

Int. Cl.⁴ C07D *491/048, 405/02, 498/04*

U.S. Cl. 544—278 **6 Claims**

1. A compound of the formula



I

where

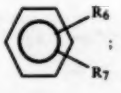
R_1 and R_2 are the same or different and are hydrogen or C_1–C_3 alkyl;

R_3 is hydrogen, C_1–C_{10} alkyl, C_3–C_8 branched-chain alkyl, C_3–C_8 alkenyl, C_3–C_6 alkynyl, $-(CH_2)_m-CO_2R_4$ or $-COR_5$;

R_4 is hydrogen, C_1–C_3 alkyl, pharmaceutically acceptable alkali metal ion, pharmaceutically acceptable alkaline earth metal ion or a pharmaceutically acceptable quaternary ammonium species;

R_5 is C_1–C_{10} alkyl, C_3–C_{10} branched-chain alkyl, C_1–C_3 alkoxy or Ar;

Ar is



R_6 and R_7 are the same or different and are hydrogen, F, Cl, Br, NO_2, CF_3, C_1–C_3 alkyl, acetyl, C_1–C_3 alkoxy or acetamido;

m is 2–6; and

n is 2–4.

4,703,121

PROCESS FOR THE PREPARATION OF 5-FLUOROCYTOSINE

Bernd Bassner, Leverkusen, and Erich Klauke, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 23, 1985, Ser. No. 790,585

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1984, 3441524

Int. Cl.[4] C07D *239/30*

U.S. Cl. 544—317 **15 Claims**

1. A process for the preparation of 5-fluorocytosine comprising reacting 2,5-difluoro-4-chloropyrimidine with a proton acid in the presence of water to yield 2-hydroxy-4-chloro-5-fluoropyrimidine, and reacting the 2-hydroxy-4-chloro-5-fluoropyrimidine with ammonia to yield 5-fluorocytosine.

4,703,122

PROCESS FOR PREPARING O-PYRIMIDINYL N,N-DIMETHYL-CARBAMATES

Fritz Maurer, Wuppertal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

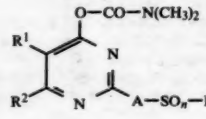
Filed Sep. 20, 1985, Ser. No. 778,342

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436478

Int. Cl.[4] C07D *239/34*

U.S. Cl. 544—319 **11 Claims**

1. A process for preparing an O-pyrimidinyl N,N-dimethyl-carbamate of the formula



in which

R stands for straight-chain or branched alkyl having 1 to 6 carbon atoms,

R^1 stands for hydrogen or for alkyl, alkoxy or alkylthio, alkylsulphinyl or alkylsulphonyl, each having 1 to 6 carbon atoms which can be optionally substituted by halogen or C_1–C_2-alkoxy,

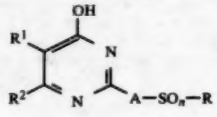
R^2 stands for hydrogen or alkyl having 1 to 6 carbon atoms which can be optionally substituted by halogen, or C_1–C_2-alkoxy, or

R^1 and R^2 together can stand for alkylene having 2 to 4 carbon atoms which can be optionally substituted by halogen or C_1–C_2-alkyl,

A stands for straight-chain or branched alkylene having 1 to 6 carbon atoms and

n stands for 0, 1 or 2,

comprising reacting a hydroxypyrimidine of the formula



in which

R, R^1, R^2, A and n have the abovementioned meanings, with an N,N-dimethylcarbamoyl halide of the formula

$$Hal—CO—N(CH_3)_2$$

in which

Hal stands for chlorine or bromine, in the presence of an acid acceptor selected from the group consisting of an alkali metal carbonate, triethylamine, trimethylamine, dimethylaniline, dimethylbenzylamine and pyrimidine and in the presence of 0.01 to 0.08 times the molar amount of a bicyclic organic amine based on the hydroxypyrimidine and in the presence of a diluent.

4,703,123

PROCESS FOR PRODUCING 2,3,5,6-TETRACHLOROPYRIDINE

Frank H. Murphy, Alvin, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sep. 19, 1986, Ser. No. 909,443

Int. Cl.[4] C07D *213/16*

U.S. Cl. 546—345 **12 Claims**

1. A process for preparing 2,3,5,6-tetrachloropyridine, comprising contacting pentachloropyridine in a solvent selected from the group consisting of C-1 to C-5 alkylnitrile, C-1 to C-5 alkylsulfoxide, tetramethylsulfone, a C-1 to C-5 alcohol or C-1 to C-5 alkylcarbonate or a mixture thereof in the presence of a quarternary ammonium salt with about 0.7 to about 1.1 gram atoms of zinc per mole pentachloropyridine.

4,703,124

PROCESS FOR INTRODUCTION OF STYRENES IN SIDE CHAIN OF SUBSTITUTED AROMATIC COMPOUNDS

Toshiyuki Tsubouchi; Tomiyasu Minokami, and Nobuaki Shimizu, all of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Dec. 19, 1985, Ser. No. 810,933

Claims priority, application Japan, Dec. 28, 1984, 274576

Int. Cl.[4] C07D *213/127*; C07C *15/46*

U.S. Cl. 546—352 **20 Claims**

1. A process for introducing one or two styrenes into a first hydrocarbon side chain of a substituted aromatic compound wherein the substituents are one or more hydrocarbon side chains having 1 to 14 carbon atoms, said first hydrocarbon side chain being one of said substituents having 1 to 14 carbon atoms and having at least one hydrogen atom in the α-position thereof, said process comprising reacting the styrene and the substituted aromatic compound in the presence of (A) an alkali metal and (B) a compound containing a benzyloxy group, an alkyl-substituted benzyloxy group, an aryl-substituted benzyloxy group, or an alkyl and aryl-substituted benzyloxy group.

4,703,125

AMIDAZOTHIODIAZONE CARBONYL COMPOUNDS USEFUL TO PREPARE NOVEL HYPOTENSIVE IMIDAZOTHIADIAZOLEALKENECARBOXAMIDES AND INTERMEDIATES THEREFOR

Axel Ingendoh, Velbert; Horst Meyer, Wuppertal, and Bernward Garthoff, Hilden, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

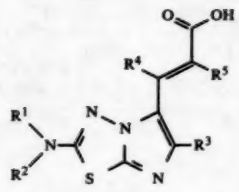
Division of Ser. No. 789,689, Oct. 21, 1985, Pat. No. 4,657,905, which is a division of Ser. No. 468,737, Feb. 22, 1983, Pat. No. 4,585,873. This application Jul. 1, 1986, Ser. No. 880,752

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1982, 3208437

Int. Cl.[4] A61K *31/425*; C07D *277/66*

U.S. Cl. 548—126 **2 Claims**

1. An alkanecarboxylic acid of the formula



in which

R^1 represents hydrogen, phenyl, or phenyl substituted by halogen, trifuloromethyl, alkyl, alkoxy, alkylmercapto or alkylamino, each having 1 to 4 carbon atoms in the alkyl and alkoxy, or by amino, or

R^1 represents an unsubstituted hydrocarbon having up to 12 carbon atoms which is uninterrupted by hetero atoms or interrupted once or twice by O, N, NH, N-alkyl having 1 to 4 C atoms, N-phenyl or N-benzyl, and said hydrocarbon being unsubstituted or substituted by hydroxyl, alkyl having 1 to 4 C atoms, trifluoromethyl, halogen, phenyl or alkoxycarbonyl having up to 5 C atoms or by dialkylamino, each alkyl containing 1 to 4 carbon atoms, the two alkyls being unconnected or forming with the nitrogen atom a 5 to 7-membered ring, containing no further heteroatoms or said 5 to 7 membered ring containing a further heteroatom selected from the group consisting of O, NH and N-alkyl having 1 to 4 C atoms, and which is unsubstituted or substituted by halogen or alkyl having 1 to 4 C atoms,

R^2 represents CXR^8,

R^8 has the meaning indicated for R^1 and being identical to or different from R^1, and

X representing oxygen, sulphur or NR^9R^{10},

R^9 and R^{10} being identical or different and representing hydrogen, phenyl, benzyl or alkyl having 1 to 6 carbon atoms, the alkyl and phenyl being unsubstituted or substituted by halogen or alkoxy having 1 to 4 carbon atoms, or represents $SO_nR^{11}n$ denoting 1 or 2 and R^{11} having the meaning indicate for R^1 and being identical to or different from R^1, or R^1 and R^2 together represent a group or the formula $=C(R^{12})$ $(Y—R^{13})$, Y representing oxygen, sulphur, NH or N-alkyl having 1 to 4 C atoms, and R^{12} and R^{13} each having the meaning indicated for R^1 and being identical to or different from R^1, R^{12} and R^{13} being unconnected or $R^{1,}$ and R^{13} connected together to form, with inclusion of =C—Y, a 5 to 7-membered ring having no further heteroatom or contains a further heteroatom from the group consisting of O, S, NH or N-alkyl having 1 to 4 C atoms.

R^3 has the meaning indicated for R^1 and is identical to or different from R^1 or represents unsubstituted phenyl, furyl, thienyl, pyrimidyl or pyridyl, or phenyl, furyl, thienyl, pyrimidyl or pyridyl substituted by 1, 2 or 3 identical or different substituents selected from the group consisting of halogen, nitro, trifluoromethyl, phenyl, alkyl, alkoxy, dialkylamino and SO_n-alkyl wherein n is 0, 1 or 2, the alkyl and alkoxy mentioned each containing 1 to 4 carbon atoms,

R^4 represents hydrogen, trifluoromethyl or alkyl.

R^5 represents hydrogen, cyano, halogen, nitro, alkyl, SO_n-alkyl or CXR^8, the alkyls mentioned containing 1 to 4 carbon atoms and n, X and

R^8 having the meaning indicated above.

4,703,126

PROCESS FOR THE PRODUCTION OF 7-ETHYL INDOLE

Peter Hardt, Visp, Switzerland, assignor to Lonza Ltd., Gampel/Valais, Switzerland

Continuation-in-part of Ser. No. 587,593, Mar. 8, 1984, abandoned. This application Aug. 13, 1986, Ser. No. 896,109

Claims priority, application Switzerland, Mar. 23, 1983, 1584/83

Int. Cl.⁴ C07D *209/08*

U.S. Cl. 548—508 **8 Claims**

1. Process for the production of 7-ethyl indole by the catalytic dehydrocyclization of 2,6-diethylaniline in the presence of steam without the addition of oxygen or an oxygen-containing gas in the presence of a catalyst, characterized in that the dehydrocyclization takes place in the presence of a copper chromite catalyst, which is activated with barium oxide, at a temperature between 500° and 700° C. and at a pressure between 0.013 and 10 bar, the molar ratio of steam to the [7-ethyl indole] 2,6-diethylaniline being within the range of 3 to 1 to 75 to 1, a raw product being obtained which includes 7-ethyl indole and at least one by-product containing a vinyl group, and the resultant raw product, in a further step, is subjected to a partial hydrogenation by means of a hydrogenation catalyst whereby most of the by-product containing a vinyl group is converted to 7-ethyl indole.

4,703,127

PROCESS FOR THE PREPARATION OF PROSTANOIDS

Rodney W. Rickards, Weetangerra; Melvyn Gill, Hughes, both of Australia, and Robert M. Christie, Neilston, Scotland, assignors to The Australian National University, Australian Capital Territory, Australia

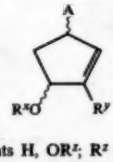
Continuation of Ser. No. 240,452, Mar. 4, 1981, abandoned, which is a continuation of Ser. No. 70,920, Aug. 30, 1972, abandoned. This application Sep. 2, 1983, Ser. No. 528,889

Claims priority, application Australia, Sep. 4, 1978, PD5809

Int. Cl.⁴ C07D *309/12;* C07F *7/04;* C07C *69/67, 29/00*

U.S. Cl. 549—214 **25 Claims**

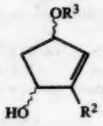
1. A compound of the general formula I:



I

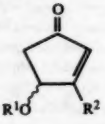
wherein A represents H, OR^z; R^z represents hydrogen or a removable alcohol protecting group selected from the group consisting of substituted silyl, alkoxyalkyl, tetrahydrofuran-2-yl and tetrahydropyran-2-yl; R^x represents hydrogen of a removable alcohol protecting group as defined above; with the proviso that R^x and R^z are not the same and that when each of R^x and R^z represents a removable alcohol protecting group, R^x is capable of being selectively removed without reomoval of R^z ; and R^y represents a group of the formula R^2- and R^2represents a straight- or branched-chain alkyl, alkenyl or alkynyl group which may optionally be substituted by one or more carboxyl, carboxylic acid ester, or free or protected hydroxy, thiol, aldehyde or keto groups; wherein the protected groups are selected from lower alkyl ethers and thio ethers, hydroxyl groups protected with substituted silyl, alkoxyalkyl, tetrahydrofuran-2-yl or tetrahydropyran-2-yl group, non-cyclic or cyclic acetals and ketals and their thio analogues.

15. A process for the preparation of compounds of the general formula Ig:.



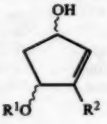
wherein R^2 is as defined in claim 1 and R^3 represents a removable alcohol protecting group selected from the group consisting of substituted silyl, alkoxyalkyl, tetrahydrofuran-2-yl and tetrahydropyran-2-yl, which comprises:

(a) reduction of a compound of the general formula Id:



Id

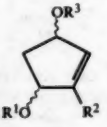
wherein R^1 represents a removable alcohol protecting group selected from the group consisting of substituted silyl, alkoxyalkyl, tetrahydrofuran -2-yl and tetrahydropyran-2-yl, with the proviso that R^1 and R^3 are not the same protecting group and $R^1$is capable of being selectively removed without removal of R^3, and $R^2$is as defined in claim 1, to produce a compound of the general formula Ie



Ie

wherein $R^1$and $R^2$are defined above;

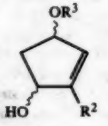
(b) protection of the free hydroxyl substituent of compound of the general formula If



If

wherein R^1, R^3 and R^2 are as defined above and;

(c) selective removal of the R^1 protecting group of a compound of the general formula If as defined above to produce a compound of the geIneral formula Ig:



Ig

wherein R^3 and R^2 are as defined above.

4,703,128

GUANIDYLFUNGIN DERIVATIVES AND THEIR PRODUCTION

Teruhiko Beppu, Tokyo; Kazutoh Takesako; Teruya Nakamura, both of Kusatsu, and Akira Obayashi, Uji, all of Japan, assignors to Takahara Shuzo Co., Ltd., Kyoto, Japan

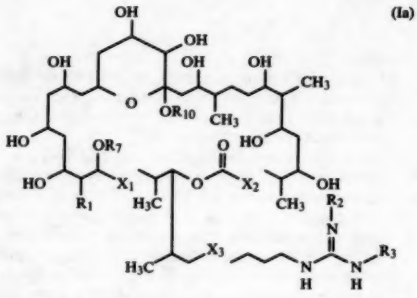
Division of Ser. No. 787,320, Oct. 15, 1985, abandoned. This application Jul. 18, 1986, Ser. No. 885,818

Claims priority, application Japan, Oct. 15, 1984, 59-214289

Int. Cl.[4] C07D *315/00, 325/00*

U.S. Cl. 549—270 2 Claims

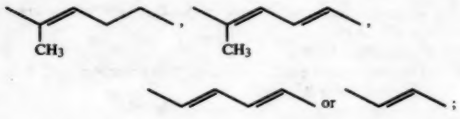
1. A process for preparing a compound represented by general formula (Ia) described below:



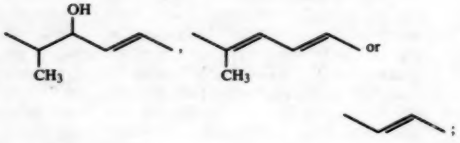
(Ia)

wherein

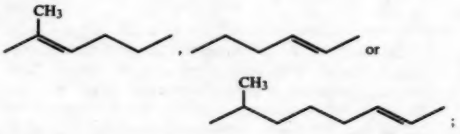
X_1 represents



X_2 represents



X_3 represents

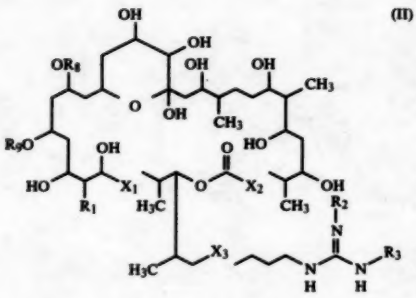


R_1 represents H or CH_3;

R_2 and R_3 which may be the same or different, each represent H or a lower alkyl group;

R_7 represents H or a lower alkyl group; and

R_{10} represents a lower alkyl group; or an acid salt thereof, which process comprises reacting a compound represented by general formula (II) described below:



(II)

wherein X_1, X_2, X_3, R_1, R_2 and R_3 are as described above and R_8 and R_9, which are different from each other, each represent H or $COCH_2COOH$, with an alcohol represented by general formula (III) described below:

$$R_{10}—OH \qquad \text{(III)}$$

wherein R_{10} is the same as described above, in the presence of an acid catalyst to alkylate the compound of general formula (II), and then hydrolyzing the malonic acid monoester.

4,703,129

PROCESS FOR THE CONTINUOUS PREPARATION OF TRIOXANE

Karl-Friedrich Mück, and Karlheinz Burg, both of Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,846

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1984, 3445921

Int. Cl.[4] C07D *323/06, 319/06, 317/12*

U.S. Cl. 549—368 9 Claims

1. Process for the continuous preparation of trioxane, by trimerization of formaldehyde in aqueous solution, in the presence of acidic solid-bed catalysts, wherein the conversion is carried out without simultaneous evaporation.

4,703,130

ANTIHYPERTENSIVE PHOSPHATE DERIVATIVES

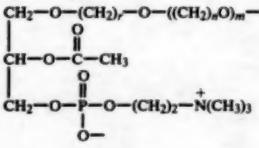
Allan Wissner, Ardsley, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 10, 1984, Ser. No. 679,789

Int. Cl.[4] C07F *9/10*

U.S. Cl. 558—169 3 Claims

1. Compounds, including the individual R and S enantiomers and the racemic mixtures, represented by the formula:



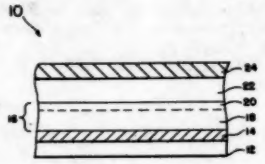
wherein r is 8, n is 2, and m is 2.

4,703,131

$CDS/CUINSE_2$ SOLAR CELLS WITH TITANIUM FOIL SUBSTRATE

Harry W. Dursch, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 18, 1985, Ser. No. 799,041
Int. Cl.[4] H01L 31/06
U.S. Cl. 136—258 20 Claims



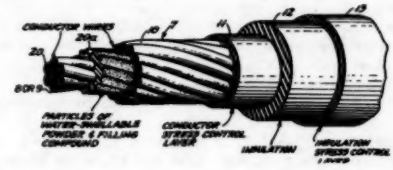
17. A solar cell comprising polycrystalline thin film photoactive layers of $CuInSe_2$ and (Cd,Zn)S a 2–5 mil titanium foil substrate, and a base contact between the photoactive layers and the substrate, wherein the cell has a specific power in excess of about 350 watts/kg.

4,703,132

FILLING COMPOUND FOR MULTI-WIRE CONDUCTOR OF AN ELECTRICAL CABLE AND CABLES INCLUDING SUCH COMPOUND

Fabrizio Marciano-Agostinelli, and Marco Barbaro-Forleo, both of Short Hills, N.J., assignors to Pirelli Cable Corporation, Union, N.J.

Filed May 16, 1986, Ser. No. 864,196
Int. Cl.[4] H01B 7/28
U.S. Cl. 174—23 C 14 Claims



1. An electrical power transmission cable including a conductor surrounded by insulation material and a filling compound filling any interstices in said conductor, said filling compound comprising:

a polymeric compound which has a 100 gram needle penetration value between 50 and 100 tenths of a millimeter at 25° C.; and

particles of a water swellable material contacting said polymeric compound, said particles having a particle size not greater than 200 microns.

10. A method of making an electrical power transmission cable having a plurality of layers of conductive wires thereby providing an outer layer of wires and an inner layer or layers of wires, said method comprising:

bringing together said wires while applying flowable polymeric compound around at least the said wires forming the inner layer or layers;

putting particles of a water swellable material having a particle size not greater than 200 microns into contact with said polymeric compound which has been applied around said wires forming said inner layer or layers;

extruding a layer of semi-conductive material around said wires; and

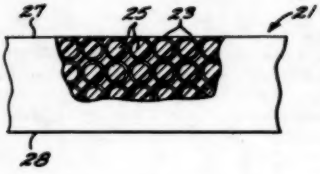
extruding a layer of insulation around said layer of semi-conductive material.

4,703,133

ELECTROMAGNETIC SHIELD

John S. Miller, 8023 Naylor Avenue, Los Angeles, Calif. 90045

Filed Jun. 5, 1986, Ser. No. 870,899
Int. Cl.[4] H05K 9/00
U.S. Cl. 174—35 GC 19 Claims



1. An electromagnetic shield comprising:

a plurality of closed, electrically-conductive rings, each having an open center; and

binder means for arranging the plurality of rings in a predetermined, fixed relationship relative to each other, the so-arranged rings and binder means defining an outer surface;

wherein electromagnetic energy received by the shield from a source adjacent its outer surface induces an electrical current to flow in a predetermined direction adjacent and parallel to the outer surface, through the plurality of rings;

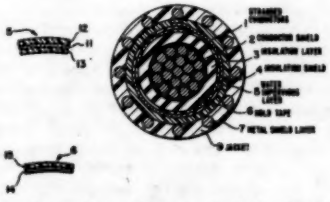
and wherein each ring is configured to cause source-induced alternating current flowing through the portion of the ring closest to the outer surface to electromagnetically induce an oppositely-directed current in the portion of the ring furthest from the surface, such oppositely-directed current bucking any source-induced current in the latter ring portion and thus reducing the magnitude of current flowing through it, whereby the electromagnetic shielding effected by the shield is enhanced.

4,703,134

WATER IMPERVIOUS RUBBER OR PLASTIC INSULATED POWER CABLE

Tadayuki Uematsu, Chiba, Japan, assignor to Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1986, Ser. No. 884,010
Claims priority, application Japan, Jul. 23, 1985, 60-112591[U]
Int. Cl.[4] H01B 7/28
U.S. Cl. 174—106 SC 16 Claims



1. A water impervious rubber or plastic insulated power cable, comprising:

a cable core;

a water impervious layer formed around said cable core, said water impervious layer comprising a laminated tape which includes a metal foil and an electrically conductive plastic film; and

a hold tape layer formed on said water impervious layer, said hold tape layer having an excellent expanding property to follow a heat cycle of the power cable;

said hold tape layer comprising a tape comprising a synthetic

resin fiber cloth and an electrically conductive rubber layer, said synthetic resin fiber cloth having a memory rate of expansion and contraction (A) of at least 30% in at least one of the transverse and longitudinal directions of said tape, said memory rate of expansion and contraction (A) being given by:

$$A(\%)=(a-b)/a\times 100$$

where,

a=hank (mm) in the case of applying a load of 2/1000 gf×20 number per 1d of the indicated denier and another load of 1/10 gf×20 number per 1d of the indicated denier; and

b=hank (mm) in the case of applying a load of 2/1000 gf×20 number per 1d of the indicated denier.

4,703,135

ARTICULATED CABLE BEND LIMITING APPARATUS

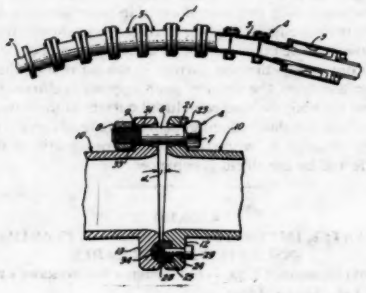
Francesco Magnani, Pavia, and Attilio Invernizzi, Milan, both of Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan, Italy

Filed Dec. 18, 1986, Ser. No. 943,620

Claims priority, application Italy, Dec. 20, 1985, 23316 A/85

Int. Cl.⁴ H01R *13/56;* **H02G** *15/007*

U.S. Cl. 174—135 **7 Claims**



1. Apparatus for limiting the bending of a cable, said apparatus comprising:

a plurality of rigid tubular elements having a tubular bore greater in diameter than the diameter of the cable, the bending of which is to be limited;

each of said tubular elements having a tubular body and a pair of outwardly extending flanges, one at one end of said body and the other at the other end of said body, one of said pair of flanges having at least one through-hole extending substantially parallel to the axis of said body and having at least one semi-spherical seat diametrically opposite to said through-hole and the other of said pair of flanges having a pair of diametrically opposite through-holes extending substantially parallel to said axis of said body, one of said pair of through-holes being axially aligned with said through-hole in said one of said pair of flanges and the other of said pair of through-holes being axially aligned with said semi-spherical seat in said one of said pair of flanges;

connecting means for extending through the axially aligned through-holes; and

a projecting member having a semi-spherical surface secured in said other of said pair of through-holes with said semi-spherical surface thereof protruding from the face of said other of said pair of flanges which faces away from said body.

4,703,136

SEALING BODY FOR FEEDTHROUGH FOR AT LEAST ONE CONDUCTING MEMBER THROUGH A WALL OPENING

Werner Hauff, Herlsbühlstr 19, 7925 Ballmertshofen, Fed. Rep. of Germany

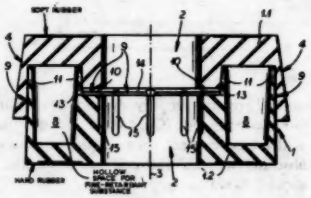
PCT No. PCT/DE85/00093, § 371 Date Aug. 29, 1985, § 102(e) Date Aug. 29, 1985, PCT Pub. No. WO85/04461, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 28, 1985, Ser. No. 774,609

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3412400

Int. Cl.⁴ F16L *5/02;* **H01B** *17/30*

U.S. Cl. 174—152 G **15 Claims**



1. A fire-retardant feedthrough for a conductor transversing an opening in a wall, said feedthrough comprising a sealing body having an axis and formed with a conductor passage extending axially therethrough for receiving a conductor, said sealing body being constituted from a soft elastic part composed of an elastomer containing at most a limited proportion of flame retardant additives and a stiff part composed of an elastomer containing a substantial proportion of flame retardant additives and of a hardness greater than that of said soft part, said soft and hard parts axially adjoining one another and each lying generally transverse to said axis,

said soft part being formed with:

a recess axially opening toward said hard part and surrounded by an elastic annular apron defining an outer wall of said body,

an axial passage portion adapted to hug a conductor and extending away from said hard part and communicating with said recess, and

a joint surface inwardly of said apron between said axial passage portion and said recess and extending generally transverse to said axis; and

said hard part being fitted into said soft part and being formed with:

a joint surface extending generally transverse to said axis and adapted to abut said joint surface of said soft part,

an annular rim received in said recess for pressing said apron outwardly into engagement with a wall of an opening, and

an axial passage portion adapted to surround a conductor and extending away from said soft part and terminating at said joint surface of said hard part and aligned with said axial passage portion of said soft part to complete therewith said conductor passage in said body.

4,703,137

ELECTRIC SWITCHGEAR WITH A PULL-OUT FRAME AND A SWITCHING DEVICE THAT CAN BE INSERTED THEREIN

Peter Bohnen; Ludvik Godesa; Reinhard Kugler, and Ulrich Marquardt, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 19, 1986, Ser. No. 944,377

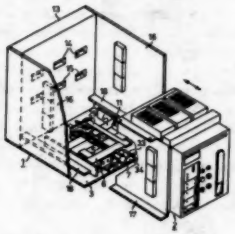
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545779; Apr. 8, 1986, 3612120; Apr. 8, 1986, 3612118

Int. Cl.⁴ H01H *9/20*

U.S. Cl. 200—50 AA **19 Claims**

1. An electric switchgear having a pull-out frame and a switching device which can be inserted into the pull-out frame,

wherein the switching device comprises an actuating means for operating a contact apparatus of the switching device, said actuating means further having means for locking said actuating means, the pull-out frame being provided with a positioning drive adapted to be coupled to the switching device and having a threaded spindle for moving the switching device when the switching device is coupled to the positioning drive, the pull-out frame having a tripping means arranged thereon having a sensing means disposed adjacent said threaded spindle



and adapted to be actuated by a tool provided for operating the threaded spindle, the switching device having a coupling means arranged thereon which cooperates with a tripping device, of the actuating means of the switching device and with the tripping means, said tripping means operating to move said coupling means thereby to move said tripping device to trip said switching device when said tool is inserted into said switchgear to operate said threaded spindle and contact said sensing means.

4,703,138

PROTECTED SWITCH UNIT FOR CASSETTE TAPE RECORDER

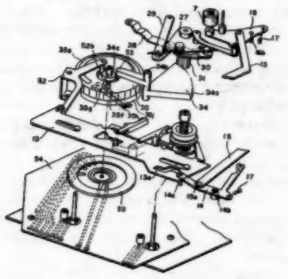
Shoji Suzuki, Iwaki, Japan, assignor to Alpine Electronics Inc., Japan

Filed Mar. 31, 1986, Ser. No. 846,574

Claims priority, application Japan, Mar. 30, 1985, 60-47175[U]

Int. Cl.[4] **H01H** *9/04, 21/08;* **G11B** *1/00*

U.S. Cl. 200—61.58 R **3 Claims**



1. In a cassette tape recording and reproducing device having a tape loading and unloading mechanism, a reversible rotary motor, and a power transmission system including a rotatable cam for controlling operation of the reversible rotary motor to drive the tape loading and unloading mechanism,

the improvement of a protected switch unit comprising:

a contact terminal mounted to one surface of said rotatable cam;

a printed circuit board spaced apart opposite from said one surface of said rotatable cam having a circuit pattern thereon for forming an electrical circuit for operating said reversible rotary motor, said contact terminal being movable with said rotatable cam over a predetermined path of movement and having an extremity end thereof which is conductive and is moved in contact with conductive parts of said circuit pattern so as to provide a switching operation for operating said reversible rotary motor;

a raised annular protective member mounted on said printed circuit board enclosing the area of said path of movement of said end of said contact terminal in contact with said printed circuit board providing said switching operation, said protective member having an annular surface provided in sealing engagement with a depending circumferential edge of the surface of said rotatable cam so as to prevent contamination of the space between said rotatable cam and said enclosed area of said printed circuit board.

4,703,139

METHOD IN A SNAP DOME SWITCH KEYBOARD ASSEMBLY FOR REDUCING CONTACT BOUNCE TIME

Bill D. Dunlap, Firestone, Colo., assignor to KB Denver, Inc., Frederick, Colo.

Continuation of Ser. No. 529,265, Sep. 6, 1983, abandoned. This application Jun. 20, 1986, Ser. No. 874,895

Int. Cl.[4] **H01H** *13/70*

U.S. Cl. 200—76 **3 Claims**

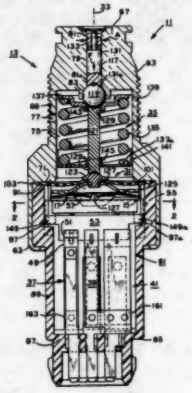
1. A method of reducing contact bounce time in a dual channel snap dome switch keyboard assembly, wherein the assembly includes a printed circuit board having conductive paths on both surfaces defining at least one switch site on one of said surfaces, said site including an outer ring shaped contact and inner first and second contacts providing dual channel circuit operation, electrically conductive snap dome switch means coacting with the switch site for normally maintaining said contacts open and for selectively closing said contacts when in a depressed and flattened state, said snap dome switch means including a single individual dome switch having a peripheral edge in continuous engagement with said ring shaped contact and a central portion in registry with said inner contacts and in engagement therewith when said snap dome switch means is flattened thereby bridging the contacts, means retaining said snap dome in registry with said switch site, a button actuator having a post in alignment with said snap dome switch means, and bezel means for retaining the button actuator in working relation with said board, said method including the step of disposing an elastomeric sheet of material between the post of said button actuator and said dome switch which receives and transmits the force applied to said button actuator to said dome switch.

4,703,140

ELECTRIC CIRCUIT CONTROLLING DEVICE

Ronald W. Poling, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Nov. 18, 1986, Ser. No. 932,126
Int. Cl.[4] H01H 35/34
U.S. Cl. 200—83 P 1 Claim



1. An electric circuit controlling device comprising:

a housing including an atmospheric chamber interposed between an electrical chamber and a bore in said housing, a control port in pressure fluid communication with said bore, a first seat on said housing in said atmospheric chamber and extending generally about said bore, a second seat on said housing extending generally about said electrical chamber, a pair of first opposed slots in said housing intersecting with said second seat, respectively, and a pair of second opposed slots in said housing spaced from said first opposed slots and intersecting with said second seat, respectively;

force transmitting means for reciprocal movement in said housing and having a plurality of conjointly movable component parts including a piston movable in said bore and having a pair of generally opposite end portions, one of said opposite end portions defining an effective area on said piston subjected to fluid pressure at said control port to establish a force urging said piston in said bore toward said atmospheric chamber, ball means for engagement with the other of said opposite end portions on said piston and with said first seat, a spacer having a generally circular ridge thereon, a connector secured to said spacer, and a push rod interposed in abutment between said ball means and said connector;

a spring in said atmospheric chamber caged between a pair of spring retainers, one of said spring retainers being disposed in displacement preventing engagement with said housing in said atmospheric chamber, and the other of said spring retainers being biased into engagement with said ball means by the caged compressive force of said caged spring urging said ball means toward engagement with said first seat and said other opposite end of said piston;

diaphragm means sealably arranged with said housing and sealably received between said connector and said spacer for isolating said atmospheric chamber from said electrical chamber;

snap action means in said electrical chamber and operable generally for discrete snap action movement between a stable configuration and an unstable configuration thereof, said snap action means including a convex surface engaged with said circular ridge on said spacer, a concave surface generally opposite said convex surface, and a marginal edge between said convex and concave surfaces and predeterminately spaced from said second seat when said ball means is engaged with said first seat;

an actuator reciprocally movable in said opposed first slots and extending generally across said electrical chamber, said actuator including a pair of generally opposite abutments, and one of said opposite abutments being engaged with said concave surface on said snap action means;

a rotatable member in said electrical chamber including a pair of generally opposite trunnions rotatably mounted in said opposed second slots, and a pair of angularly spaced flanges interposed between said opposite trunnions and extending in part across said electrical chamber, respectively, and one of said flanges being engaged with the other of said opposite abutments on said actuator;

a set of resilient switch elements mounted in said electrical chamber and operable with creeping movement between a plurality of circuit controlling positions, respectively, at least one of said switch elements in one of the circuit controlling positions thereof exerting a resilient force onto the other of said flanges on said rotatable member so as to resiliently maintain the engagements between said rotatable member, said actuator, said snap action means and said spacer, respectively;

overtravel spring means operable in said electrical chamber between a plurality of biased positions for exerting another resilient force on said other flange of said rotatable member additive to the first named resilient force of said at least one switch element, said overtravel spring means including flange means for engagement with another of said switch elements urging said another switch element toward one of the circuit controlling positions thereof when said overtravel means is in one of its biased positions, and said another switch element being conjointly movable from the one circuit controlling position toward another of the circuit controlling positions thereof with said overtravel spring means;

said force transmitting means being initially movable against the caged resilient force of said caged spring and the additive resilient forces of said at least one switch element and said overtravel spring means when the force acting on said piston attains a first preselected force level to displace said ball means from said first seat and to engage said marginal edge of said snap action means with said second seat when the force attains a second preselected force level predeterminately greater than the first preselected force level and the movement of said force transmitting means being translated from said snap action means to initially move said actuator in said opposed first slots and initially rotate said rotatable member in said opposed second slots so as to operate said at least one switch element with creeping movement from the one circuit controlling position toward another of the circuit controlling positions thereof and also operate said overtravel spring means from the one biased position toward another of the biased positions thereof with said flange means being disengaged from said another switch element upon the conjoint movement of said another switch element from the one circuit controlling position toward the another circuit controlling position thereof with said overtravel spring means;

switching means mounted in said electrical chamber and operable generally for snap action movement between a plurality of circuit controlling positions; and

said force transmitting means being further movable against the caged resilient force of said caged spring and the additive resilient forces of said at least one switch element and said overtravel spring means when the force acting on said piston attains a third preselected force level predeterminately greater than the second preselected force level to effect the discrete snap action movement of said snap action means from the stable configuration toward the unstable configuration thereof when said marginal edge of said snap action means is engaged with said second seat and the discrete snap action movement of said snap action

means being translated therefrom to further move said actuator with snap action in said opposed first slots and further rotate said rotatable member with snap action in said opposed second slots so as to engage said other flange of said rotatable member with said switching means and effect the operation of said switching means with snap action movement from one of the circuit controlling positions toward another of the circuit controlling positions thereof.

4,703,141

ACTUATION ATTACHMENT FOR ELECTRICAL CONTROLLING AND SIGNALLING DEVICES, PARTICULARLY FOR EMERGENCY CIRCUIT BREAKERS

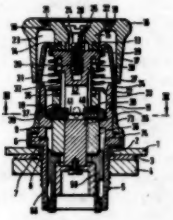
Heinz Grunst, Marienheide, Fed. Rep. of Germany, assignor to Square D Starkstrom GmbH, Marienheide-Rodt, Fed. Rep. of Germany

Filed Aug. 16, 1985, Ser. No. 766,814

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1984, 84110053

Int. Cl.[4] H01H *3/20, 9/24, 13/00*

U.S. Cl. 200—340 **13 Claims**



1. An actuation attachment for an electric controlling or signalling device, comprising a tubular housing having an inner wall defining a central axis; a sleeve arranged in said housing for movement along and around said central axis, the sleeve having two opposite ends and a jacket formed with two radially directed openings; a cylindrical slider arranged in said sleeve for movement along and around said central axis, the slider having two opposite ends and a jacket formed with an axially directed slot diverging towards one of said ends, said slider being coupled to the sleeve for joint rotation therewith and for an axial movement either relative to or in conjunction with the sleeve; locking means arranged in said slot of the slider and being spring biased to project through said openings in said sleeve; first and second axially directed guiding means formed one above the other in the inner wall of said housing to guide said locking means, said first guiding means being provided at their lower ends with inclined stopping surfaces for engaging said locking means when said sleeve and said slider are in a rest position, said second guiding means being provided at their upper ends with radially directed stopping surfaces for holding via said locking means said sleeve and said slider in an actuated position, said second guiding means being further provided with axially directed curved run on surfaces for disengaging said locking means from said radially directed stopping surfaces when the slider is turned around said center axis; an actuation member arranged in said housing below one end of said sleeve, said actuation member being movable along said center axis between a rest position in which it is disengaged from an electric controlling or signalling device, and an actuated position in which it activates said device; a holding member secured to one end of said slider and slidably guiding and supporting said actuation member; an outer pressure spring arranged between said housing and a second end of said slider to urge the slider into said rest position; an inner spring arranged between said second end of the slider and a second end of said sleeve to displace by snap action the sleeve and slider thereby forcing said actuation member into said actuated position when the slider is depressed by an operator beyond a point at which said locking means disengage said inclined stopping surfaces.

4,703,142

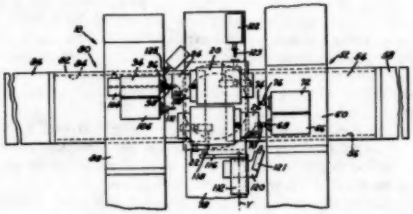
METHOD OF COMBINING GRINDING AND EDM OPERATION FOR FINISHING FUEL INJECTOR NOZZLE BODIES

Victor F. Dzewaltowski; James Halvorsen, both of Springfield, Vt., and John M. Check, Chelsea, Mich., assignors to Ex-Cell-O Corporation, Walled Lake, Mich.

Filed May 1, 1986, Ser. No. 857,880

Int. Cl.[4] B23H *1/00, 9/10*

U.S. Cl. 219—69 M **5 Claims**



1. A method for concentrically forming a valve guide bore and a valve seat in respective fuel injector nozzle body blanks having a center-cut bore terminating in a blind hole defined in part by a pre-formed cone shaped surface to locate a needle valve component therein so as to reduce the fuel dribble capacity of the nozzle body, said method comprising the following steps:

a. loading a first blank at one station on one of two work head means on an indexable turret;
b. indexing the turret 90 degrees;
c. non-contact machining a valve seat surface on the preformed cone shaped surface of the first blank to be concentric with the longitudinal axis of the nozzle body;
d. moving a first cross slide bearing the non-contact machining means to align seat lapping means with the valve seal surface;
e. lapping the valve seat surface;
f. returning the cross slide to its preceding position;
g. indexing the turret another 90 degrees;
h. loading a second blank on the second work head means;
i. indexing the turret a further 90 degrees;
j. grinding the bore of the first blank to be concentric with the longitudinal axis of the nozzle body while concurrently and concentrically non-contact machining the valve seat surface of the second blank;
k. concurrently moving said first cross slide and a second cross slide bearing the bore grinding means to align respective seat lapping and bore lapping means with said first and second blanks;
l. lapping the respective value seat and bore so as to be concentric with one another;
m. returning the first and second cross slides to their respective preceding positions; and
n. unloading the first blank as a finished fuel injection nozzle body.

4,703,143

WIRE EDM METHOD FOR PREVENTING WIRE LAGGING DURING MACHINING OF AN ANGULAR CORNER AND WORKPIECE POSITION CONTROL

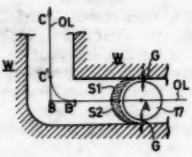
Yasumi Okubo, Sagamihara, and Asami Morino, Kanagawa, both of Japan, assignors to Amada Company, Limited, Japan

Filed Dec. 20, 1985, Ser. No. 811,368

Claims priority, application Japan, Dec. 25, 1984, 59-271689; Jan. 30, 1985, 60-014382

Int. Cl.[4] B23H *7/06*; G05D *15/00*

U.S. Cl. 219—69 W **10 Claims**



1. A machining control method for electrical discharge machining of a workpiece in which a pair of wire electrode guides for guiding a wire electrode are advanced relative to said workpiece along a predetermined outline having a first straight line portion, a change of direction point, a second straight line portion, and a third straight line portion in accordance with a set of predetermined machining parameters comprising the steps of:

(a) advancing said wire electrode guides relative to said workpiece along the first straight line portion of said outline while machining said workpiece according to a first set of predetermined machining parameters;

(b) halting the advance of said wire electrode guides relative to said workpiece when said wire electrode guides reach the change of direction point of said outline and machining said workpiece according to a second set of predetermined machining parameters:

(c) advancing said wire electrode guides relative to said workpiece along the second straight line portion of said outline while machining said workpiece according to a third set of predetermined machining parameters; and

(d) resuming the advance of said wire electrode guides while machining said workpiece according to said first set of predetermined machining parameters when said guides reach the third straight line portion of said outline.

4,703,144

EDM CONTROL SYSTEM TO MAXIMIZE EFFICIENCY BY CONTROLLING THE GAP WIDTH

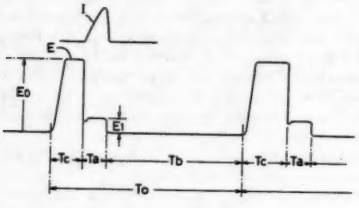
Makoto Goto, Toki; Takao Okabe, and Akihiro Komori, both of Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 13, 1985, Ser. No. 711,168

Claims priority, application Japan, Mar. 19, 1984, 59-53193

Int. Cl.[4] B23H *1/02, 7/18*

U.S. Cl. 219—69 P **13 Claims**



1. An electrical discharge machining system wherein an electrically conductive workpiece and an electrode are moved relative to each other with a machining gap maintained between the electrode and the workpiece, and wherein the workpiece is machined through the energy of electrical discharges at the machining gap by application of a voltage between the workpiece and the electrode, comprising:

a feed device for effecting a relative movement between the workpiece and the electrode;

an electrical discharge power supply circuit for applying power from a power source to the workpiece and the electrode, said power supply circuit incorporating a switching element which closes and opens said power supply circuit;

switching control means for turning off said switching element at the end of a first predetermined time interval after a start of each electrical discharge which takes place between the workpiece and the electrode during said relative feeding movement while said switching element is held on, and for turning on said switching element at the end of a second predetermined time interval after the start of said electrical discharge, said second predetermined time interval being longer than said first predetermined time interval, a cycle time of each electrical discharge consisting of a sum of said second predetermined time interval and a pre-discharge time between the turning-on of said switching element and said start of each electrical discharge, said second predetermined time interval consisting of a sum of an electrical-discharge time represented by said first predetermined time, and a rest time following said electrical discharge time;

a counter for counting the number of actual electrical discharges which have occurred between the workpiece and the electrode during a preset sampling interval;

feed control means for controlling the operation of said feed device to regulate a rate of said relative feeding movement between the workpiece and the electrode, so as to reduce a difference between the counted number of said actual electrical discharges and a preset optimum number of electrical discharges;

arithmetic means for calculating an average predischarge time, based on said sampling interval, said second predetermined time interval and the counted number of said actual electrical discharges;

means for calculating an average gap current flowing through said machining gap, based on the calculated average predischarge time, said electrical-discharge time, said rest time, and an actual gap current flowing through said machining gap during a length of said electrical-discharge time; and

display means for indicating the calculated average gap current.

4,703,145

APPARATUS FOR MANUFACTURING A MASTER RACK

Arthur E. Bishop, P.O. Box 936, Crows Nest, New South Wales, and Klaus J. Roeske, Beverly Hills, both of Australia, assignors to Arthur E. Bishop, Mosman, Australia

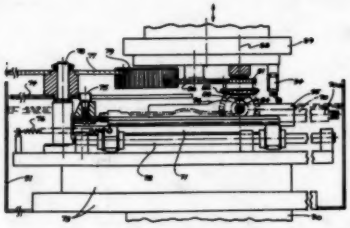
Division of Ser. No. 769,790, Aug. 26, 1985, Pat. No. 4,602,521, which is a continuation of Ser. No. 333,421, Dec. 13, 1981, abandoned. This application May 19, 1986, Ser. No. 864,525

Int. Cl.[4] B23H *1/00, 7/26*

U.S. Cl. 219—69 R **4 Claims**

1. Apparatus for making a master rack with which to make forging dies to form a rack having a toothed end of teeth having tooth gaps of varying height and a plain end, the rack having at least two zones along its axis, one on each side of the center of the toothed end of the rack of teeth having tooth gaps of varying height, providing a variation of slack-free mesh center distance between the pinion and the rack, the maximum mesh center distance occurring in the mid-travel position of the rack and lesser mesh center distances occurring at positions of travel of the rack either side of the mid-travel position, the tooth gaps in either said zone being of varying heights along

their lengths and the heights of all those parts of said tooth gaps that engage the pinion in any position of travel of the rack in either said zone being equal, consisting of an EDM machine having upper and lower platens and means to raise and lower the upper platen, rack blank supporting means capable of longitudinal movement in the direction of the rack blank axis arranged on the lower platen, an electrode in the form of a



facsimile of a helical pinion rotatably mounted in a bracket attached to said upper platen, means for rotating said electrode intermittently, means to effect axial movement of the rack blank past the electrode in accordance with the rotational movement of the electrode, further means defining the height position of the electrode in relation to the axis of the rack blank in a predetermined height relationship according to the position of the electrode in relation to its travel along the rack axis.

4,703,146

WIRE EDM TAPER CUTTING METHOD USING PATH DATA OF TWO PLANES OF A WORKPIECE

Mitsuo Kinoshita, Tokyo, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

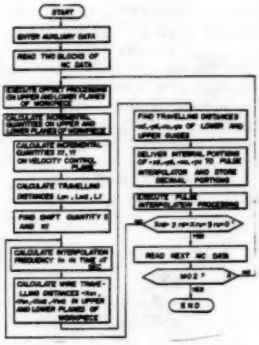
PCT No. PCT/JP84/00426, § 371 Date Apr. 26, 1985, § 102(e) Date Apr. 26, 1985, PCT Pub. No. WO85/01001, PCT Pub. Date Mar. 14, 1985

PCT Filed Sep. 6, 1984, Ser. No. 732,010

Claims priority, application Japan, Sep. 6, 1983, 58-163713

Int. Cl.[4] B23H *7/06*; G05B *19/25*

U.S. Cl. 219—69 W **1 Claim**


START
ENTER AUXILIARY DATA
READ TWO BLOCKS OF NC DATA
EXECUTE OFFSET PROCESSING ON UPPER AND LOWER PLANES OF WORKPIECE
CALCULATE HORIZONTAL DISTANCES ON UPPER AND LOWER PLANES OF WORKPIECE
CALCULATE HORIZONTAL QUANTITIES Δf, Δf ON VELOCITY CONTROL PLANE
CALCULATE TRAVELLING DISTANCES Lxf , Lxd , Lf
FIND SHIFT QUANTITY S AND Δf
CALCULATE INTERPOLATION FREQUENCY Nf IN TIME Δf
CALCULATE WIRE TRAVELLING DISTANCES IN UPPER AND LOWER PLANES OF WORKPIECE
FIND TRAVELLING DISTANCES OF LOWER AND UPPER GUIDES
DELIVER INTEGRAL PORTIONS TO PULSE INTERPOLATOR AND STORE DECIMAL PORTIONS
EXECUTE PULSE INTERPOLATION PROCESSING
YES
READ NEXT NC DATA
M02 ?
YES
END

1. A wire electrode discharge machining method for cutting a workpiece by moving a wire electrode relative to the workpiece and producing an electric discharge across the wire electrode and the workpiece, comprising the steps of:

preparing and entering path data specifying contours on an upper and on a lower plane of the workpiece;

separately preparing and entering auxiliary data including an amount of wire diameter compensation, workpiece mounting position and guide positions necessary for moving the wire electrode relative to the workpiece;

continuously finding first relative travel quantities (Δx_{w1}, Δy_{w1}; Δx_{w2}, Δy_{w2}) of the wire electrode with respect to the upper and lower planes of the workpiece over a predetermined period of time;

converting said first relative travel quantities into second relative travel quantities (Δx_u, Δy_u; Δx_d, Δy_d) of the upper and lower guides with respect to said workpiece by using said auxiliary data including workpiece mounting position and guide position data;

moving the upper and lower guides relative to the workpiece in accordance with said second relative travel quantities;

producing pulses of a number of equivalent to integral portions of said second relative travel quantities to move the uppr and lower guides relative to the workpiece; and

correcting subsequent second relative travel quantities of the upper and lower guides with respect to the workpiece by decimal portions of the present second relative travel quantities.

4,703,147

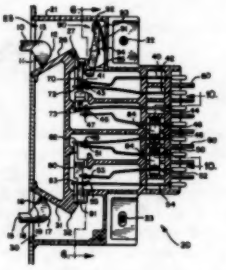
PROBE ACTUATED SWITCH

Lawrence R. Happ, Mundelein; Gerald A. Stark, Winthrop Harbor, and Stephen M. Drensky, Waukegan, all of Ill., assignors to The Cherry Corporation, Waukegan, Ill.

Filed Jun. 5, 1986, Ser. No. 871,097

Int. Cl.[4] H05B *6/64*

U.S. Cl. 219—10.55 C **23 Claims**



19. In a microwave oven having a housing defining a microwave cooking cavity, a door for closing the cavity and a switch for applying power to the oven, the improvement comprising:

probe means carried on said door;

means for pivotally biasing said probe means;

switch means of said housing for engaging said probe means to latch said door and apply power to the microwave oven when the door is closed, said switch means including

actuator means for moving between a door open position and a door closed position in response to the opening and closing of said door;

electrical contact means responsive to movement of the actuator means for applying power to the microwave oven when the actuator means moves to said door closed position and disconnecting power when the actuator means moves to the door open position;

latch means for holding said actuator means in said door open position when the door is open and while the door is closing and for releasing said latch means to allow it to move to said door closed position when the door is closed; and

means for guiding said probe means within the switch means and pivoting the probe means against its bias as the door is being closed and, when the door is closed,

engaging the probe means to latch the door; said probe means moving said latch means to release said actuator means and pivoting against the actuator means under said bias when the door is closed to rapidly snap the actuator means to said door closed position and thereby apply power to the microwave oven.

4,703,148

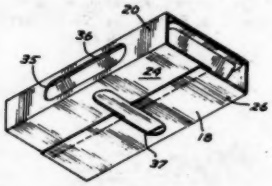
PACKAGE FOR FROZEN FOODS FOR MICROWAVE HEATING

Barry S. Mikulski, Plymouth; Duane L. McDonald, Minneapolis, and Lynn B. Deffenbaugh, Brooklyn Center, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Oct. 17, 1986, Ser. No. 919,946

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 E **19 Claims**



1. A package useful for packaging a frozen food to be heated and browned by microwave energy in a microwave oven, comprising:

an outer carton having a top closed major surface, a bottom closed major surface spaced apart and parallel to the top, a pair of spaced, parallel closed side elements, and a pair of spaced, opposed open sides defining an interior food cavity, said carton being fabricated from a dielectric material, wherein each of said major surfaces and closed side elements include a microwave shield layer, wherein each closed side element has a window and wherein the bottom closed major surface has a window;

a tray having a bottom positioned within said cavity for supporting the food;

a first browning means mounted in the bottom of said tray capable of converting microwave energy into heat for browning a lower surface of the food located within said cavity;

a first spacer positioned intermediate the first browning means and the bottom closed major surface said spacer having a thickness ranging from about 1 to 25.0 mm. thereby defining a first plate separation between the microwave shield and the first browning means ranging from about 1 to 25.0 mm.;

a second browning means capable of converting microwave energy into heat for browning an upper surface of the food positioned above and resting upon the food; and

a second spacer positioned intermediate the second browning means and the top closed major surface said spacer having a thickness ranging from about 1 to 25 mm. thereby defining a second plate separation between the microwave shield and the second browning means ranging from about 1 to 25 mm.

4,703,149

CONTAINER HEATED BY MICROWAVE OVEN

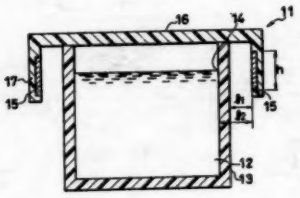
Ko Sugisawa, Nara; Masanori Yamamoto, Kaizuka, and Ryusuke Nakanaga, Takatsuki, all of Japan, assignors to House Food Industrial Company Limited, Higashiosaka, Japan

Filed Dec. 4, 1985, Ser. No. 804,540

Claims priority, application Japan, Dec. 10, 1984, 59-260190; Dec. 14, 1984, 59-263866; Dec. 14, 1984, 59-263867

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 E **17 Claims**



1. A container for use in heating by a microwave oven, comprising:

a container body for containing a material to be heated, said material having an upper surface at a prescribed level, said container body having a side wall, a bottom portion and an upper opening portion;

a lid covering said upper opening portion, said lid having a portion which overhangs said container body; and

a microwave shielding layer which is disposed on said portion in such a manner that said shielding layer concentrically surrounds said container body and that a portion of said side wall from an upper edge of said side wall of said container body to 5–95% of the height of said side wall is covered by said shielding layer, so as to cover a region of said side wall in the vicinity of said prescribed level by said shielding layer, said microwave shielding layer and said region being separated by an air layer having a horizontal length of at least 0.5 mm, wherein the container body and said lid, other than a portion of said lid having said shielding layer disposed thereon, are transparent to microwaves.

4,703,150

WELDABLE CONNECTING MEMBER FOR CONNECTING OR JOINING THERMOPLASTIC PIPE ELEMENTS

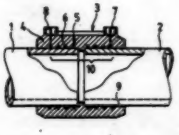
Walter Kunnecke, Binningen; Urs Amacher, Aeschi, and Max Meier, Luterkofen, all of Switzerland, assignors to Von Roll AG, Gerlafingen, Switzerland

Filed Aug. 26, 1985, Ser. No. 769,851

Claims priority, application Switzerland, Aug. 28, 1984, 4126/84

Int. Cl.[4] H05B *3/58*

U.S. Cl. 219—535 **15 Claims**



1. A weldable connecting member for connecting thermoplastic pipe elements comprising a thermoplastic body having a heating element embedded therein defining a welding area for generating heat for welding the body to the pipe elements,

said body being provided with a cavity having a cover in the welding area, an indicator having a piston and an indicator pin secured thereto positioned in said cavity and movable during welding by plasticized material forced into said cavity under said piston, from an initial position near the welding area into an end position remote from the welding area, said indicator being provided with means when in the end position to indicate a measure of the temperature and pressure conditions in the welding area.

4,703,151

HEATING COOKING APPLIANCE HAVING WEIGHT DETECTING FUNCTION

Kazuho Sakamoto, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

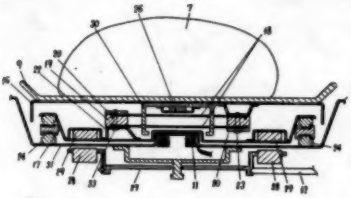
PCT No. PCT/JP84/00379, § 371 Date Dec. 23, 1985, § 102(e) Date Dec. 23, 1985, PCT Pub. No. WO85/03115, PCT Pub. Date Jul. 18, 1985

PCT Filed Jul. 26, 1984, Ser. No. 817,745

Claims priority, application Japan, Jan. 5, 1984, 59-415; Feb. 20, 1984, 59-30531

Int. Cl.⁴ H05B *6/68*

U.S. Cl. 219—518 **3 Claims**



1. A heating cooking appliance having a weight detecting function and devices for generating a magnetic field including at least a high tension transformer and a fan motor, said appliance comprising

a heating chamber for accommodating and heating food;

a heat source for heating the food;

a table for mounting the food thereon;

spring means attached to said table and having a vibration frequency which varies depending on the weight of the food mounted on said table;

means for detecting the vibration frequency of said table which is generated when the food is mounted on said table by converting the vibration of said table into a change in a magnetic field;

a control circuit for calculating the weight of the food from a result of the detection of the vibration frequency of said table and controlling the heating output, heating pattern and heating time of said heat source in accordance with the calculated weight of the food; and

deenergizing means for deenergizing said devices for generating a magnetic field while the weight of the food is being detected, whereby an undesirable magnetic influence on said detecting means is prevented.

4,703,152

TILTABLE AND ADJUSTABLY OSCILLATABLE PORTABLE ELECTRIC HEATER/FAN

Shao Shih-Chin, San-Chung, Taiwan, assignor to Holmes Products Corp., Holliston, Mass.

Filed Dec. 11, 1985, Ser. No. 807,822

Int. Cl.⁴ H05B *1/02*; F04D *25/10*; F24H *3/04*; H02P *1/46*

U.S. Cl. 219—370 **7 Claims**

1. A portable heater/fan which can be made to oscillate from side to side over either one of two different angular distances or remain stationary and which can be tilted backward or forward so as to provide a beam of hot or cold air whose lateral extent and direction can be adjusted over two mutually perpendicular axes, said heater/fan comprising:

a. a base adapted to be placed on a horizontal surface for supporting the heater/fan,

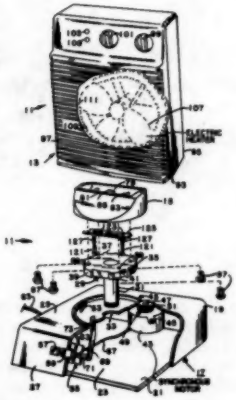
b. a shaft mounted on said base for rotation about a vertical axis,

c. a main gear fixedly mounted on said shaft for rotation therewith,

d. a synchronous electric motor mounted on said base and operatively connected to said main gear for causing said main gear to rotate with said shaft about said vertical axis,

e. first cooperable limit means on said base and said main gear for causing said synchronous motor to oscillate said main gear through a first angular distance about said vertical axis.

f. second cooperable limit means on said base and said main gear for causing said synchronous motor to oscillate said main gear through a second angular distance about said vertical axis smaller than said first angular distance,



g. switch means for selectively actuating said synchronous motor and for selectively rendering either said first limit means or said second limit means operative to select the angular distance of oscillation of said main gear about said vertical axis.

h. a neck joint fixedly mounted on said main gear for oscillating therewith,

i. a compartment having a heater/fan assembly for providing a beam of hot or cold air through the forward end thereof, and

j. means for pivotally mounting said compartment on said neck joint for selective tilting movement in either a forward or rearward direction relative to said base, said switch means being a unitary switch assembly including an electrical means for energizing the synchronous motor and mechanical means for simultaneously selectively rendering either the first or second limit means operative.

4,703,153

ELECTRIC HEATER EMPLOYING SEMICONDUCTOR HEATING ELEMENTS

Kosta Pelonis, Bradford, Canada, assignor to Pelko Electric Inc., Weston, Canada

Filed Jun. 24, 1985, Ser. No. 747,863

Int. Cl.⁴ H05B *1/02, 3/06*; F24H *3/04*

U.S. Cl. 219—370 **18 Claims**

13. An electric heater comprising:

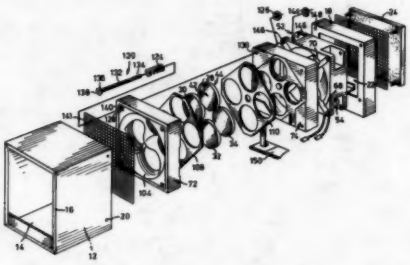
a housing having a rear air inlet and a forward air inlet;

a fan mounted inside the housing for producing an air flow forwardly from the rear air inlet to the forward air outlet,

the fan having a fan venturi for directing the air flow including a forward venturi opening, a rear venturi opening and a longitudinal venturi axis;

a multiplicity of plate-shaped heating elements each having a core of semiconductor material with a positive resistance-temperature coefficient, each core having a pair of opposing core faces including a forward core face and a rear core face and a multiplicity of apertures extending between the forward and rear core faces whereby air can flow through the cores, each heating element having a forward conductive coating over its forward core face and a rear conductive coating over its rear core face;

a heating element holder mounted in the housing intermediate of the forward venturi opening and the forward air outlet and having forward and rear holder faces, the heating element holder including holding means for holding the heating elements in generally coplanar, spaced-apart relationship and for orienting each of the cores generally perpendicular to the longitudinal venturi axis and spaced forwardly of the forward venturi opening, the rear holder



face having a recess positioned over the forward venturi opening to receive substantially all air flow from the forward venturi opening, the holder having a multiplicity of passages each having a forward passage opening in the front face of the heating element holder and a rear passage opening in the recess spaced forwardly of the forward venturi opening, each passage having an associated one of the heating elements positioned intermediate of its forward and rear passage openings and so oriented that all air flow in the passage flows through the associated heating element, each passage flaring radially outwardly and rearwardly from the rear core face of the associated heating element to its rear passage opening, the recess flaring radially outwardly and rearwardly from about the rear passage openings to the rear face of the heating element holder; and,

electrical contact means extending into the heater element holder for use in placing the forward and rear conductive coatings of the heating element cores and the fan in contact with a source of electric power.

4,703,154

INFRARED RAY HEATER

Ryoichi Ikegami, Nagoya, and Hitoshi Kojima, Tokai, both of Japan, assignors to NGK Insulators, Ltd., Aichi, Japan

Filed Dec. 26, 1985, Ser. No. 813,681

Claims priority, application Japan, Aug. 6, 1985, 60-120383[U]

Int. Cl.[4] H05B *3/18, 3/48*

U.S. Cl. 219—345 **4 Claims**

1. An infrared ray heater comprising:

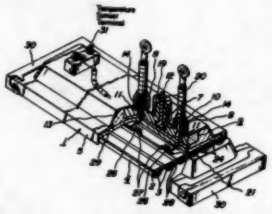
an infrared ray heater unit made of a ceramic board with a zigzag-shaped continuous groove formed on one side surface thereof and a resistive heater wire disposed in the groove, said groove having a pair of narrow portions at a central part of the ceramic board so as to hold the opposite ends of the heater wire at the narrow portions of the groove;

a heat-insulating material disposed on said ceramic board, said heat insulating material having a recess;

a terminal insulator member disposed on said recess of heatinsulating material, which insulator member has a pair of lead wire bosses extending away from said terminal insulator member at positions aligned with the narrow portions of said groove respectively and a fastening bolt boss extending away from said terminal insulator member at an intermediate position between the two lead wire bosses, the fastening bolt boss holding securely one end of a fastening bolt, said fastening bolt having a threaded end extending in a direction away from the ceramic board;

a metallic case overlying on both said terminal insulator member, said heat-insulating material and said ceramic board, said metallic case having holes through which said lead wire bosses and said fastening bolt boss extend away from said ceramic board;

a first heat-resistant insulation collar for the fastening bolt boss and a second heat-resistant insulation collar for the lead wire boss placed on said metallic case so as to surround said fastening bolt boss and said lead wire bosses, respectively;



a planar reflector disposed on said first and second heat-resistant insulating collars;

an insulating end cap placed on said first heatresistant insulation collar so that a sidewall of the end cap surrounds said fastening bolt boss, said insulating end cap having a hole bored through a flat end portion thereof so as to allow said threaded end of the fastening bolt to extend therethrough;

a nut screwed on said threaded end of the fastening bolt so as to combine said infrared ray heater unit, said terminal insulator member, and said metallic case; and

a pair of lead wires which are connected to said opposite ends of the heater wire at said narrow portions of the groove and extend through the lead wire bosses respectively; and

a pair of coupler caps which engage opposite ends of both said metallic case and said ceramic board respectively so as to couple tightly the ceramic board to the metallic case;

whereby said ceramic board of the infrared ray unit, terminal insulator member, metallic case and planar reflector are secured together by the fastening bolt and nut together with the first and second heat-resistant insulation collars for the fastening bolt boss and for the lead wire boss respectively and the insulating end cap so as to improve the heat-resistive insulating ability.

4,703,155

ELECTRIC FOGGER

John I. Suhajda, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Dec. 30, 1986, Ser. No. 947,712

Int. Cl.[4] A01M *13/00*; H05B *1/02*

U.S. Cl. 219—271 **6 Claims**

5. An electric fogging apparatus comprising:

(a) a housing;

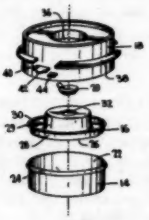
(b) a canister for removable insertion into said housing comprising

(1) a container having an open top which holds a fog-producing material and which is constructed of a material which will transfer heat from a heat source to said fog-producing material;

(2) an insert secured in said container to close said open top and having a dome with a discharge port to allow the release of a fog; and

(3) a cap attached to said container for covering said container having an opening overlying said discharge port of said insert to allow the release of a fog and having at least one lug extending from said cap for activating said electric fogger;

(c) a means on said housing for receiving and replaceably holding said canister in said housing;



(d) an electrical heating means in said housing for heating said canister in said housing;

(e) an electrical timing means within said housing which controls said heating means whereby said heating means is operated for a predetermined period of time; and

(f) an electrical switch means constructed and arranged with said timing means and said heating means for activating said timing means and said heating means, said switch means being activated by one of said lugs on said canister upon insertion and rotation of said canister in said receiving and holding means of said housing;

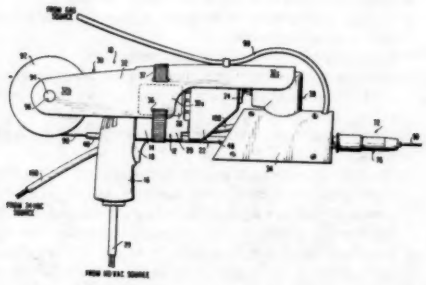
thereby heating said canister, the heat being transferred to said fog-producing material to produce a fog which is released to an environment of use through the discharge port of said insert and the opening in ssid canister cap.

4,703,156

MIG WELDER ATTACHMENT FOR AN ELECTRIC HAND DRILL

Peter F. Hayes, Santa Fe, N. Mex., assignor to Omniverse Research, Inc., Los Gatos, Calif.

Filed Oct. 21, 1985, Ser. No. 789,907
Int. Cl.[4] B23K *9/10*; H05B *7/11*
U.S. Cl. 219—136 **7 Claims**



1. A welder attachment for an electric hand drill for welding a metal workpiece acting as a first electrode, said hand drill comprising:

an electrically insulated drill casing, a drill drive electric motor, said motor including a motor shaft having an end projecting outwardly of the drill casing, a first electrical power source for supplying electrical power to said motor, switch means mounted to said drill casing for selectively connecting and disconnecting the first electrical source to said electric motor,

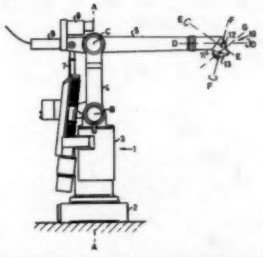
said welder attachment comprising: a cover for attachment to the drill casing, a functional wire drive means for coupling to the drill motor shaft for feeding a consumable, fine wire second electrode, an electron nozzle assembly connected to the wire drive means and including a metal conductor tube receiving said fine wire second electrode fed by the wire drive means and means for connecting a second DC electrical arc power source to said metal conductor tube such that, when said second DC electrical power source is connected to the workpiece first electrode to create a potential difference and said fine wire second electrode is positioned in juxtaposition to the workpiece first electrode, an electric arc is created therebetween capable of melting the tip of the fine wire second electrode to effect welding, wherein the speed of weld is adapted to be controlled by said motor switch means and wherein the arc power is independent of that of the power source for the hand drill motor and wherein both soft and hard consumable wire electrodes may be readily employed as the source of weld material.

4,703,157

ROBOT WRIST

Håkan Dahlquist, Västerås, Sweden, assignor to ASEA Aktiebolag, Västerås, Sweden

Filed Jun. 30, 1986, Ser. No. 880,174
Claims priority, application Sweden, Jul. 3, 1985, 8503312
Int. Cl.[4] B23K *26/08*
U.S. Cl. 219—121 LU **4 Claims**



1. The combination of a wrist mechanism and a plurality of mirrors, said wrist mechanism being attachable to a hollow robot arm and can support a working tool, said wrist mechanism comprising

a first tubular wrist part which defines a first central axis therethrough and which has a first end and a second end, said first end being mountable on said robot arm so as to be rotatable about said first central axis and said second end having an oblique orientation relative to said first central axis, said first central axis defining a first rotation axis of said wrist mechanism,

A second tubular wrist part which defines a second central axis therethrough and which has a first end and a second end, each of said first and second ends having an oblique orientation relative to said second central axis,

first journal means for mounting the first end of said second tubular wrist part to the second end of said first tubular wrist part and to enable said second tubular wrist part to

rotate relative to said first tubular wrist part about a second rotation axis which intersects said first central axis,

a third tubular wrist part which defines a third central axis therethrough and which has a first end and a second end, said first end having an oblique orientation relative to said third central axis,

second journal means for mounting the first end of said third tubular wrist part to the second end of said second tubular wrist part and to enable said third tubular wrist part to rotate relative to said second tubular wrist part about a third rotation axis which intersects said third central axis,

bevel gear means interconnecting the second end of said first tubular wrist part with the first end of said third tubular wrist part so as to cause coordinated rotation therebetween,

a tool attachment means,

a third journal means for mounting said tool attachment means on the second end of said third tubular wrist part and to enable said tool attachment means to rotate relative to said third journal means about a fourth rotation axis which intersects said third rotation axis, and

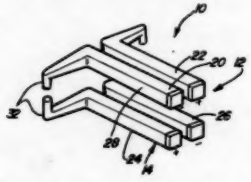
a plurality of mirrors arranged in the hollow interior of said wrist mechanism so that a light beam arriving from a hollow robot arm may pass unrefracted through all of said wrist parts, irrespective of the mutual rotary positions of said wrist parts, a first one of said plurality of mirrors being placed at the point of intersection between said first central axis and said second rotation axis, a second of said plurality of mirrors being placed at the intersecting point between said second rotation axis and said third rotation axis, and a third of said plurality of mirrors being placed at the intersecting point between said third rotation axis and third central axis, whereby said mirrors have such an inclination that a light beam arriving along said first central axis is diverted along said second and third rotation axes and said third central axis.

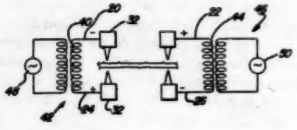
4,703,158

HIGH FREQUENCY WELDING SYSTEM

Peter H. Burgher, Utica, and John Boomer, Howell, both of Mich., assignors to Marelco Power Systems, Inc., Howell, Mich.

Filed Mar. 31, 1986, Ser. No. 846,025
Int. Cl.[4] B23K *11/10, 11/24*
U.S. Cl. 219—90 **8 Claims**





1. A welding system comprising:

a pincer assembly comprising a first and second jaw, each jaw comprising a pair of welding arms;

means for pivotally mounting said first jaw to said second jaw so that said jaws are movable between an open and a closed position, said jaws adapted to clampingly engage a work therebetween, wherein when said jaws are in said closed position, one arm on said first jaw registers with one arm on said second jaw and the other arm on said first jaw registers with the other arm on said second jaw; and

means for supplying an alternating electrical current to the arms of said first jaw so that the polarity of current flow in one arm of said first jaw is opposite from the polarity of current flow in the other arm of said first jaw and, simultaneously, the polarity of one arm in the second jaw is opposite from the polarity of the other arm of the second jaw;

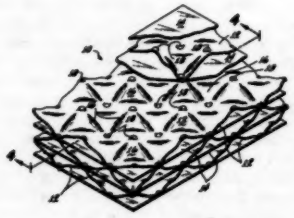
wherein each welding arm comprises an elongated shank having a welding tip at one end, said tips engaging the work when said jaws are in said closed position, and wherein said tips on said first jaw are spaced apart from each other by a distance sufficiently greater than the distance between the shanks of the arms of said first jaw to reduce the amount of surface current flow between said welding tips and said first jaw.

4,703,159

METHOD OF MANUFACTURING LIGHTWEIGHT THERMO-BARRIER MATERIAL

Winford Blair, La Mesa, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 165,277, Jul. 2, 1980, abandoned. This application Oct. 26, 1981, Ser. No. 314,667
Int. Cl.[4] B23K *1/04;* B32B *3/12*
U.S. Cl. 219—78.12 **11 Claims**



1. A method of manufacturing a lightweight metallic structure having stacked dimpled core structures with nodes each having a flat surface projecting in opposite directions from a midplane and flat material sandwiched between each of the stacked dimpled core structures and on the outer surface of the outer most stacked dimpled core structure for forming an end surface thereto, said dimpled core structure and flat plate material comprising thin metallic foil material, with the foil thickness of some of the dimpled core structures and flat plate material being thinner than the others comprising the steps of:

selecting component material of a selected size;

providing plating material between at least the node and flat plate connecting surface;

securing together the stacked components;

positioning the nodes of the dimpled core material in substantially vertical alignment during the securing together of the components;

placing the secured together components on a reference surface;

arranging the secured together components to a predetermined height and subjecting said components to a predetermined pressure against the reference surface, said predetermined pressure and height are provided by rigid tools and dead weight means, wherein said rigid tools surround the components of said lightweight metallic structure and extend to a height less than the height of the stacked components and said dead weight means forces

said components downward to a vertical height equal to the height of said rigid tools;

placing the secured together components and reference surface in a vacuum furnace; and

elevating the temperature within the furnace and maintaining that elevated temperature sufficiently long to cause a eutectic melt of the plating materials and diffuse the plating materials into the base material of the adjacent components creating a diffusion bond between the node flat surface and adjacent flat plate material while maintaining the predetermined height and predetermined pressure to prevent crushing of the dimpled core material during the eutectic melting and diffusion bonding sequence.

4,703,160

CASING STRUCTURE OF PORTABLE ELECTRONIC APPLIANCE

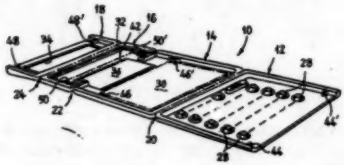
Wataru Narishima, and Shoji Takeuchi, both of Tokyo, Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 9, 1986, Ser. No. 872,291

Claims priority, application Japan, Jun. 14, 1985, 60-129402

Int. Cl.[4] G06C 5/02

U.S. Cl. 235—1 D **5 Claims**



1. A unital casing structure in combination with a portable calculator, comprising

at least four panel sections having substantially straight boundary lines therebetween and including a key-top panel section having a plurality of integral key portions, a switch-pad panel section having a switch pad structure installed thereon, a display housing panel section having a display device installed thereon, and a display window panel section formed with a window providing visual access to the display device,

adjacent two of said key-top, switch-pad, display housing and display window panel sections being integrally coupled together across the boundary line between the two panel sections and being foldable with respect to each other about an axis extending along the boundary line therebetween so that the adjacent two panel sections are coupled together in a face-to-face relationship to provide a keyboard division by the combination of the key-top and switch-pad panel sections which are folded against each other and a display division by the combination of the display housing and display window panel sections which are folded against each other.

4,703,161

RUGGEDIZED CALCULATOR

Roger D. McLean, 2111 W. Dixon, Mesa, Ariz. 85201

Filed Sep. 30, 1986, Ser. No. 913,713

Int. Cl.[4] G06C 5/02

U.S. Cl. 235—1 D **10 Claims**

1. An improved calculator comprising:

electronic circuit means including a plurality of conventional keypad switchs;

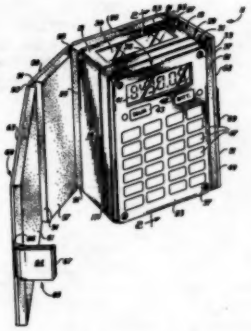
a digital readout displaym eans;

a carrier frame for operatively housing said digital read out display means and said electronic circuit means including said keypad switches;

means for covering the rear of said frame, said covering means including means for enabling said calculator to float;

means for housing a source of potential in said frame for operating said electronic circuit means;

means for covering the front of said frame with a face panel having apertures for said keypad switches and said digital display means;



an outer casing including a rear panel, a pair of side panels, and a front access panel, each of said panels including a relatively thick layer of foam means attached to an exterior layer of relatively unbreakable plastic casing material;

said front access panel being hingedly secured to one of said side panels for selectively opening and closing access to said keypad switches and digital display means of said calculator.

4,703,162

DEVICE FOR RECEIVING, INSPECTING AND STORING INSTRUMENTS OF VALUE

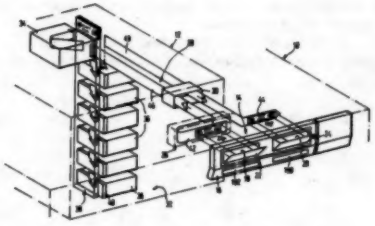
Guenter Holland-Letz; Waldemar Jaeger, both of Paderborn; Udo Tewes, Paderborn-Elsen, and Peter Weigel, Borchen-Doerenhagen, all of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Apr. 16, 1986, Ser. No. 852,676

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513635

Int. Cl.[4] G06F 15/30

U.S. Cl. 235—379 **22 Claims**



1. A device for receiving, inspecting and storing instruments of value such as bank notes, comprising:

a lockable housing enclosing at least one instrument receptacle, inspection means for inspecting and identifying the instruments, a deposit unit having a deposit pocket and a return pocket arranged on a wall of the housing, and conveyor means for conveying instruments between said deposit unit and the inspection means and for conveying instruments between the inspection means and the instrument receptacle;

a locked vault enclosing said instrument receptacle and a first part of said inspection means, said locked vault having an opening formed in a wall, said conveyor means having a two-way conveyor passing through said opening for transferring said instruments of value between the deposit unit and the inspection means and between the receptacle and the deposit unit.

4,703,163

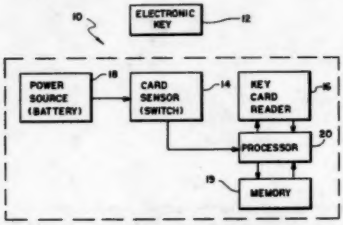
SECURITY SYSTEM

Leonard J. Genest, 1061 Tropic La., Santa Ana, Calif. 92705

Filed Aug. 22, 1985, Ser. No. 768,258

Int. Cl.[4] G06K *5/00*

U.S. Cl. 235—382 **6 Claims**



1. An energy conserving security system having at least one electronic lock and at least one electronic key, comprising:

memory means for maintaining data within said memory means without the application of any electrical energy to said memory means;

means for sensing the occurance of said electronic key inserted in said electronic lock;

means for sensing the occurance of said electronic key being removed from said electronic lock; and

first processor means for supplying the power needs of the memory means, said first processor means being adapted to apply electrical energy to said sensing means senses the insertion of said electronic key into said electronic lock, and being adapted to remove said electrical energy from said memory means when said sensing means senses the removal of said electronic key from said electronic lock.

4,703,164

AUTOMATIC CASH-COLLECTING MONITORING INSTALLATION

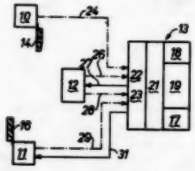
Fritz von Ballmoos, Horgen, Switzerland, assignor to Dr. von Ballmoos AG, Switzerland

Filed Mar. 24, 1986, Ser. No. 843,126

Claims priority, application Switzerland, Mar. 22, 1985, 1267/85

Int. Cl.[4] G07B *15/02*

U.S. Cl. 235—384 **6 Claims**



1. An automatic cash-collecting monitoring installation for pay parking lots, having at least one entrance monitoring apparatus (10) which issues a parking token and opens an entrance barrier (14) when a vehicle drives up, and having at least one cash register (12) which displays the parking fee after the parking token has been inserted, and causes an exit barrier (16) to open after the fee displayed has been paid, wherein the entrance monitoring apparatus (10) contains a magazine (36) for a large number of parking tokens (37), each of which has a machine-readable individual code (FIG. 3), and a means (41) for issuing individual parking tokens and for reading (39) the code, and an electronic central unit (13) whose memory (19) stores the data associated with the issuing of each parking token and which, when the parking token is inserted into the cash register (12), supplies the data required for calculating the parking fee.

4,703,165

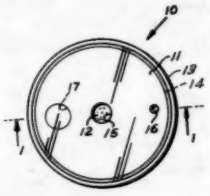
TOKEN WITH INFORMATION DATA

Jesse L. Colodner, 322 Orangeburg Rd., Pearl River, N.Y. 10965, and Conrad Riumbau, 33-04 Junction Blvd., Jackson Heights, both of N.Y. 11372

Filed May 30, 1986, Ser. No. 868,698

Int. Cl.[4] G06K *19/06*

U.S. Cl. 235—487 **5 Claims**



1. A token with information data, comprising, a pair of discs, for covering a substrate disc having magnetic information to be sensed, and openings provided in said token for sensing purposes, stringing said token, stacking said token, and packaging said token.

4,703,166

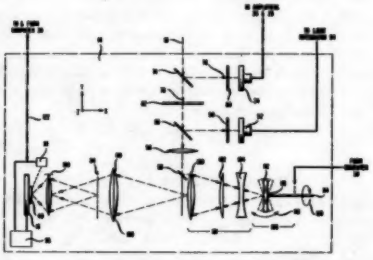
SYSTEM FOR MAINTAINING THE OPTICAL ALIGNMENT BETWEEN STATIONARY AND MOVING EQUIPMENT IN DEEP-UV LITHOGRAPHY

John H. Bruning, Brookside, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 623,247, Jun. 21, 1984, abandoned. This application May 12, 1986, Ser. No. 862,475

Int. Cl.[4] G01J *1/20;* **B23K** *9/00*

U.S. Cl. 250—201 **15 Claims**



1. Apparatus for optical lithography, comprising

stationary first equipment including a laser source,

second equipment including a stepping table physically separated from said stationary first equipment,

and means for directing signals from said laser source in said stationary first equipment to said second equipment to maintain a prescribed alignment between the direction of

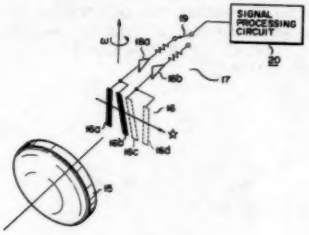
propagation of said signals and said second equipment even during movement of said second equipment due to stepping of said table.

4,703,167

STAR SCANNER WITH SEMICONDUCTOR PHOTOSENSITIVE ELEMENTS HAVING RETICLES

Eisuke Okumura, and Katsuhiko Tsuno, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 5, 1986, Ser. No. 903,764
Claims priority, application Japan, Sep. 11, 1985, 60-200860
Int. Cl.[4] G01J *1/20*; G01B *11/26*
U.S. Cl. 250—203 R **4 Claims**



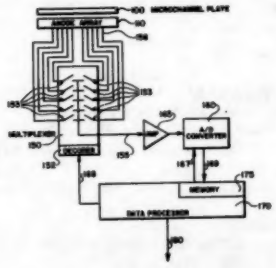
1. A star scanner comprising:
an optical system for forming a star image;
a pair of semiconductor photosensitive elements constituting a letter V provided at a scanning section for the star image formed by said optical system;
reticles, arranged between said optical system and each of said semiconductor photosensitive elements, for constituting a plurality of photosensitive sections and light-blocking sections on a photosensitive surface of each of said photosensitive elements along a star image scanning direction; and
a signal processing section for generating detection data on the star image in accordance with an output signal from each of said semiconductor photosensitive elements.

4,703,168

MULTIPLEXED WEDGE ANODE DETECTOR

Gaylord Olson, Plainsboro, N.J., assignor to Princeton Applied Research Corporation, Princeton, N.J.

Filed Jul. 22, 1985, Ser. No. 757,178
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—207 **13 Claims**



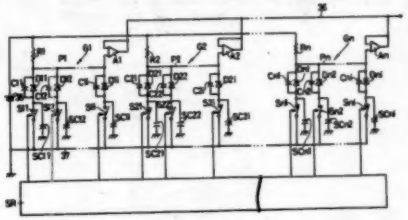
1. An apparatus for image detection comprising:
a plurality of wedge-shaped anode detectors, each detector including a base portion and a vertex portion and being arranged along a first axis in an alternating sequence such that, except for the detectors at the end of said sequence, the vertex portion of any of said detectors is adjacent to the base portions of the two adjacent detectors, said wedge-shaped anode detectors also each including an output terminal for presenting a detection signal representing the amount of said incident energy on the detector containing that terminal;
a multiplex output line;
means, coupled to each of said detector output terminals, for multiplexing said detection signals at said output terminals onto said multiplex output line; and
sequencing means coupled to said multiplexing means for controlling said multiplexing means to present on said multiplex output line a data signal containing a predetermined sequence of said detection signals from selected ones of said detectors, said data signal containing image detection information.

4,703,169

READING APPARATUS HAVING PIN STRUCTURE WHEREIN STORAGE AND PARASITIC CAPACITANCE DIFFERS

Hirotaka Arita, Kagoshima, Japan, assignor to Kyocera Corporation, Kyoto, Japan

Division of Ser. No. 747,062, Jun. 20, 1985. This application Dec. 18, 1986, Ser. No. 945,072
Claims priority, application Japan, Jun. 21, 1984, 59-128530; Jun. 11, 1985, 60-127499; Jun. 13, 1985, 60-129418
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—211 J **4 Claims**



1. A reading apparatus comprising:
a plurality of photoelectric converter elements each provided with electric charge storage means, said photoelectric converter elements adapted to store electric charge in said electric charge storage means upon receiving light;
a plurality of switches each connected in series with one end of each of the photoelectric converter elements;
means for leading out an amount of electric charge as a signal when the amount of electric charge is stored in said electric charge storage means;
means for rendering said plurality of switches conductive successively in time sequence;
said electric charge storage means comprising a storage capacitor;
said photoelectric converter element comprising a photodiode;
wherein said storage capacitor and said photodiode are substantially integrally formed of amorphous silicon photoconductor and said amorphous silicon photoconductor comprises a p-i-n semiconductor.

4,703,170

INFRARED FOCAL PLANE MODULE

Charles E. Schmitz, Irvine, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation-in-part of Ser. No. 722,776, Apr. 12, 1985, Pat. No. 4,618,763. This application Nov. 3, 1986, Ser. No. 907,408

Int. Cl.[4] H01J 40/14

U.S. Cl. 250—211 R 13 Claims

1. An infrared focal plane module for interfacing a plurality of detector elements to external electronics comprising:

a plurality of integrated circuits disposed in substantially overlapping registry to form a module body, each of said integrated circuits comprising a layer of semi-conductive material disposed upon a major surface of an insulating substrate to form electronic circuits upon the surface of the substrate, each of said integrated circuits further comprising conductive areas formed along first and second edge portions of said substrate, said conductive areas being formed to communicate electrical signals to and from said integrated circuits; and

an insulating layer disposed between adjacent integrated circuits.

4,703,171

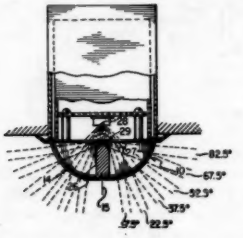
LIGHTING CONTROL SYSTEM WITH INFRARED OCCUPANCY DETECTOR

William Kahl, Brookfield, and Richard Settanni, Bethel, both of Conn., assignors to Target Concepts Inc., Brookfield, Conn.

Filed Nov. 5, 1985, Ser. No. 795,098

Int. Cl.[4] H01J 40/14

U.S. Cl. 250—221 21 Claims



1. A lighting control device for controlling the flow of electrical energy to electrical lights, comprising:

means for controlling the flow of electrical energy between a source of electrical energy and a load in the form of electrical lights, in accordance with a control signal;

passive infrared detector means for generating an electrical signal relating to infrared energy received thereby; said infrared detector means having an optical center axis;

control circuit means coupled to said detector and to said controlling means for generating said control signal;

a segmented off-axis lens for creating a plurality of fields of view for said detecting means, said fields of view extending over an arc exceeding 90 degrees, said lens comprising a plurality of selected lens segments, said segments being arranged in a series in front of said detectors means; at increasing angular positions to the perpendicular to the optical center toward a first end,

at least one reflective surface at an acute angle with respect to the center axis of said detector and positioned between said lens and said detector along the center axis of said detector, said reflective surface reflecting infrared energy passing through at least one of the respective segments at said first end of said segmented lens toward said detector.

4,703,172

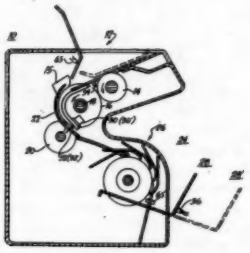
METHOD AND APPARATUS FOR COUNTING SHEETS WHICH MAY BE FED IN SKEWED AND/OR OVERLAPPING FASHION

William Sherman, III, Medford; Francis C. Larkin, Trenton, both of N.J., and Stephen J. Horvath, Bensalem, Pa., assignors to Brandt, Incorporated, Bensalem, Pa.

Division of Ser. No. 440,584, Nov. 10, 1982, Pat. No. 4,608,704. This application Mar. 17, 1986, Ser. No. 840,147

Int. Cl.[4] G01N 9/04; G06M 7/00

U.S. Cl. 250—223 R 7 Claims



1. Apparatus for counting sheets moving at spaced intervals along a feed path, comprising:

a light source positioned to one side of said feed path;

light sensor means positioned to the opposite side of said feed path for generating a light signal representing the light intensity of light rays from said light source directed across the feed path towards said light sensor means;

reference means for generating a first reference level when no sheets are passing between the light sensor and the light source;

comparator means comparing the output of said light sensor means against said first reference level for generating a first signal as the leading edge of a sheet passes between said light source and light sensor means; and

said reference means including level adjusting means responsive to the presence of said first signal for abruptly changing said reference level to a second level responsive to said first signal to prevent the generation of an erroneous signal.

4,703,173

PROBE FOR COLLECTING LIGHT FOR A RADIATION MONITORING DEVICE

Charles H. Wood, Rockville, and Richard W. Stowe, Gaithersburg, both of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Mar. 6, 1986, Ser. No. 836,896

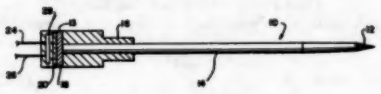
Int. Cl.[4] H01J 5/16

U.S. Cl. 250—227 9 Claims

1. Apparatus for monitoring the intensity of light within a predetermined zone comprising:

(a) a probe for collecting light comprising an optical waveguide having a proximal end, a light conducting intermediate portion, and a forward end, said forward end comprising a light-collecting tip formed from the waveguide having a non-planar, light-diffusing surface and a cross-

sectional area in a plane perpendicular to the axis of the probe which decreases to a minimum in proceeding from the light-conducting intermediate portion to the outermost end of said tip; and



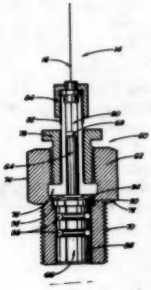
(b) means optically coupled to said proximal end of said probe for measuring light intensity.

4,703,174

FIBEROPTIC TEMPERATURE/PRESSURE SENSOR SYSTEM

John C. Anderson, Houston; Morris J. Davies, Stafford, and Archie C. Lamb, Houston, all of Tex., assignors to Fiberdynamics, Inc., Houston, Tex.

Division of Ser. No. 585,430, Mar. 2, 1984, Pat. No. 4,672,199. This application Aug. 1, 1986, Ser. No. 891,603
Int. Cl.[4] H01J 5/16
U.S. Cl. 250—227 **3 Claims**



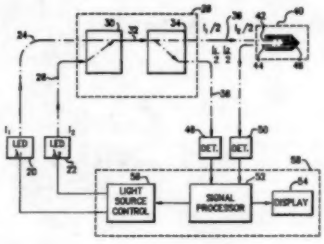
1. A fiberoptic pressure sensing system comprising:
a light source means;
sensor means responsive to an external stimulus, said sensor means being a pressure sensor comprising:
a body having a cylindrical cavity opening at one end of said body:
a carrier element arranged within said body, said carrier element having a reflective surface affixed thereto:
a pressure responsive member connected to said carrier element and movable within said body, said pressure responsive member being a piston disposed within said cavity, said piston arranged so as to move longitudinally within said body in response to pressure acting on said piston: and
a belleville spring removably disposed within said body and juxtaposed against one end of said piston, said belleville spring positioned so as to exert a desired amount of resistance against the longitudinal movement of said piston:
fiberoptic means for transmitting light from said light source means to said pressure sensor, said reflective surface for reflecting light from said fiberoptic means, said reflective surface movable relative to said fiberoptic means;
detector means arranged so as to receive light reflected by said reflective surface said detector means being responsive to the power of said reflected light; and
output means electrically connected to said detector means for producing a signal relative to the pressure acting on said piston.

4,703,175

FIBER-OPTIC SENSOR WITH TWO DIFFERENT WAVELENGTHS OF LIGHT TRAVELING TOGETHER THROUGH THE SENSOR HEAD

Michael M. Salour, Carlsbad, Calif.; Gerhard Schoner, Graz, Austria; James H. Bechtel, San Diego, Calif., and Martin Kull, Stockholm, Sweden, assignors to Tacan Corporation, Carlsbad, Calif.

Filed Aug. 19, 1985, Ser. No. 767,037
Int. Cl.[4] H01J 5/16, 40/14
U.S. Cl. 250—227 **38 Claims**



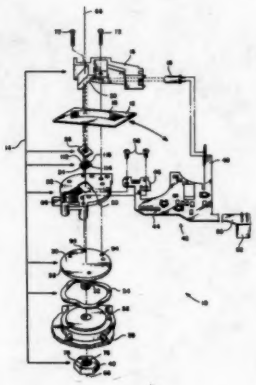
1. A fiber-optic sensing system comprising:
a light source emitting light of at least a first frequency and a second frequency;
fiber-optic sensing head means, having channeling means comprising a single light path for both frequencies therethrough, for varying light of said first frequency channeled thereto as a function of an environmental parameter to which said fiber-optic sensing head means is subjected;
detection means for detecting light of both said frequencies channeled thereto and for generating a detection signal indicative of sensed variations in the detected light
sensing fiber-optic channel means for directing light of both frequencies from said light source to said fiber-optic sensing head means and for directing light from said fiber-optic sensing head means to said detection means;
coupling means in said fiber-optic channel means between said light source and said fiber-optic sensing head means to merge the light paths of said first and second frequencies of light into a single light path for both frequencies through said fiber-optic sensing head means;
reference fiber-optic channel means for directing light of both frequencies from said light source to said detection means without passing though said fiber-optic sensing head means; and
signal processing means coupled to said detection means for processing the signals generated from light channeled through said sensing fiber-optic sensing means and for processing the detection signal generated from light channeled through said reference fiber-optic channel means, said processing being carried out in order to generate an indicating signal that accurately indicates the value of said environmental parameter as a function of said variation in the first frequency of light received from said fiber-optic sensing head means as compared to said second frequency of light received from said fiber-optic sensing head means and to both frequency portions of light received through said reference fiber-optic channel means.

4,703,176

COMPACT POLYPHASE OPTICAL POSITION ENCODER

Peter S. Hahn, Fremont; Thomas R. Stone, Pleasanton; William G. Moon, Sunnyvale, and Joel N. Harrison, Monte Sereno, all of Calif., assignors to Plus Development Corporation, Milpitas, Calif.

Filed Jun. 4, 1985, Ser. No. 741,179
Int. Cl.[4] G01D 5/34
U.S. Cl. 250—231 SE 5 Claims



4. A compact polyphase optical encoder subassembly for installation and use with host equipment including a base and a moveable, edge mounted scale with alternating equally dimensioned opaque and translucent regions extending generally perpendicular to a locus of scale movement in a dimension generally parallel to a mounting portion of the base; said subassembly comprising:

a unitized rotatable and height adjustable housing for aligning and supporting a light source, a mask and a photodetector array having at least a pair of photodetector areas symmetrically disposed about an axis of rotation of said housing and responsive to light energy from said light source in further response to relative position of said scale, said housing being rotatably alignable and height adjustable with respect to said mounting portion and including:

a cell holder mounted to said housing for holding said photodetector array and said mask in a predetermined proper alignment,

said housing further including a light source holder mounted to said cell holder for holding said light source a predetermined distance away from said cell holder, said cell holder and said light source holder defining a transverse opening enabling said scale to pass freely along its locus of movement adjacent to said mask,

said light source holder comprising a central support, a reflective surface in optical alignment with said photodetector array and being aligned and supported by said central support, and a lateral arm spaced away from said central support, said lateral arm for holding said light source in optical alignment with said reflective surface and said photodetector array,

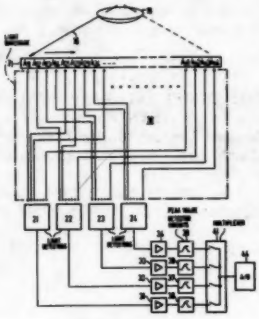
whereby said subassembly may be made very compact in terms of height and still provide a substantial distance between the light source and the mask, thereby minimizing penumbra effects.

4,703,177

ARRANGEMENT FOR THE PRODUCTION OF X-RAY PICTURES BY COMPUTER RADIOGRAPHY

Michael Vieth, Eltersdorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 820,207
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1985, 3503711
Int. Cl.[4] G01T 1/105
U.S. Cl. 250—327.2 11 Claims



1. An arrangement for the production of X-ray pictures by computer radiography comprising:

(a) a camera containing a storage plate,

(b) a reproducer including an image reader for sequentially scanning the photo-stimulated luminescence of the storage plate line by line and picture element by picture element to generate light signals,

(c) a plurality of detectors for conversion of the light signals into electrical signals, to each of which detectors several non-adjacent picture elements of a picture line are assigned,

(d) an associated image processing computer for processing the electrical signals, and

(e) a first array of light waveguides coupling the light signals from the several non-adjacent picture elements to their assigned detectors.

4,703,178

NOISE ERASING APPARATUS FOR STIMULABLE PHOSPHOR SHEET

Hiroshi Kageyama, Utsunimiya; Katsuhide Koyama, Tokyo, and Shigemi Fujiwara, Ohtawara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 725,114, Apr. 19, 1985, abandoned. This application Jan. 6, 1987, Ser. No. 4,272
Claims priority, application Japan, Apr. 19, 1984, 59-79979
Int. Cl.[4] G01T 1/11
U.S. Cl. 250—327.2 4 Claims

1. A noise erasing apparatus for erasing stored radiation energy causing noise in a resultant visible radiation image reproduced from a stimulable phosphor sheet used in radiography, comprising:

a source of alternating current;

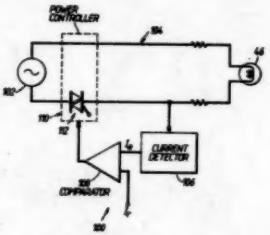
irradiation means for emitting noise erasing light at a predetermined illumination and color temperature, said irradiation means connected to said source via a power line;

current detector means connected to said line for detecting electric current passing through said irradiation means and for calculating an effective value of said current based on said detected current;

comparator means for generating a control signal based on a comparison of said effective value of current calculated by

said current detector means and a predetermined constant value; and

power controller means connected between said source and said irradiation means for maintaining at a predetermined



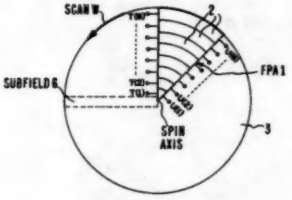
constant value load power supplied to said irradiation means responsive to the control signal generated by said comparator means so that noise erasing light of said predetermined illumination and color temperature is emitted from said irradiation means.

4,703,179

SENSOR FOR HEMISPHERICAL APPLICATIONS

Wesley D. Motooka, Irvine, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed Apr. 2, 1987, Ser. No. 33,390
Int. Cl.[4] G02B *26/10*
U.S. Cl. 250—334 **9 Claims**



1. A rotating sensor for imaging throughout a nearly hemispherical field of view with substantially constant resolution and sensitivity, said sensor comprising:

a platform which rotates about a spin axis at a constant angular rate;

mounted on the platform, a planar multi-detector array having the shape of a sector of a figure formed by up to two conic sections, said array comprising many detectors arranged in rows generally following the curvature of the conic sections; and

means for performing time delay integration (TDI) on each of the rows of detectors in such a manner that the time consumed for each TDI is the same for each row.

4,703,180

MICROWAVE DISCHARGE TYPE ION SOURCE FOR ION INJECTION DEVICES

Shunroku Taya, Mito, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

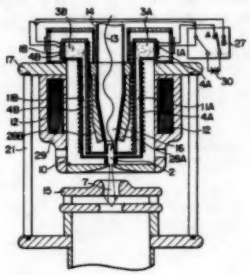
Filed Oct. 28, 1985, Ser. No. 792,285
Claims priority, application Japan, Oct. 30, 1984, 59-226745
Int. Cl.[4] H01J *27/00*
U.S. Cl. 250—425 **3 Claims**

1. An ion source for ion injection devices, comprising:

a plurality of vaporizing furnaces each for vaporizing a solid or liquid specimen disposed therein by heating through a heater respectively associated with each of said plurality of vaporizing furnaces;

a plurality of ion introducing means each for introducing vapor produced in the associated furnaces to an ionization chamber;

means for ionizing the vapor introduced in said ionizing chamber;



means for extracting ions from said ionization chamber in the form of an ion beam;

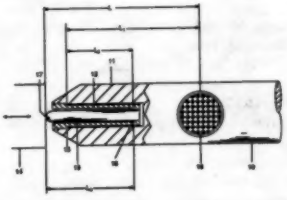
and means for selectively energizing the heater associated with a selected one of said plurality of vaporizing furnaces so as to exchange vapors introduced into said ionization chamber.

4,703,181

ANTI-DRIFT DEVICE FOR SIDE ENTRY ELECTRON MICROSCOPE SPECIMEN HOLDERS

Peter R. Swann, Diablo, Calif., and Bernd Kraus, Munich, Fed. Rep. of Germany, assignors to Gatan Inc., Pleasanton, Calif.

Filed Apr. 7, 1986, Ser. No. 848,970
Int. Cl.[4] H01J *37/20*
U.S. Cl. 250—442.1 **8 Claims**

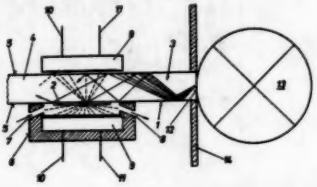


1. A device for inhibiting specimen drift in an electron microscope comprising a plurality of rigid members connected mechanically in series with their axes of thermal expansions aligned and each having particular lengths and expansion coefficients such that the change in length of the device for a given temperature change compensates the change in length for the same temperature change of an electron microscope specimen holder with which the device is in good thermal contact so that the temperature of said assembly closely follows the temperature of the specimen holder.

4,703,182
ARRANGEMENT FOR FLUORESCENCE-OPTICAL MEASUREMENT OF CONCENTRATIONS OF SUBSTANCES CONTAINED IN A SAMPLE

Herbert Kroneis, and Helmut Offenbacher, both of Graz, Austria, assignors to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof.Dr.Dr.h.c. Hans List, Graz, Austria

Filed Sep. 16, 1985, Ser. No. 776,586
Claims priority, application Austria, Sep. 17, 1984, 2955/84
Int. Cl.⁴ G01N *21/64*
U.S. Cl. 250—458.1 **13 Claims**



1. An arrangement for fluorescence-optical measurement of concentrations of substances contained in a sample, said arrangement being used in a surrounding ambient medium, comprising a light source for excitation radiation, a sensor element fluorescing upon excitation in accordance with substance concentration to be determined, and a detector for emission radiation, said sensor element comprising a carrier element which comprises at least two parallel surfaces and which is transparent for said excitation radiation and said emission radiation, said sensor element having a refractive index n_1 that is higher than the refractive index n_3 of a prevailing ambient medium, at least part of one of said surfaces of said carrier element being covered with a layer of an indicator substance of a given refractive index n_2, whose side facing away from said carrier element is in contact with said sample during the process of measurement, said excitation radiation having angles of incidence α_1, measured from the normal on the boundary surface between said carrier element and said ambient medium, which are bigger than $\alpha_{G1,3}$=arc sin n_3/n_1, so that said excitation radiation is propagated in said carrier element by total reflection and wherein said excitation radiation has angles α_1 smaller than $\alpha_{G1,2}$=arc sin n_2/n_1 in that area of said carrier element which is in contact with said sample via the indicator layer.

4,703,183
ION IMPLANTATION CHAMBER PURIFICATION METHOD AND APPARATUS

Michael Gue../a, Newburyport, Mass., assignor to Eaton Corporation, Cleveland, Ohio

Filed Dec. 5, 1985, Ser. No. 805,952
Int. Cl.⁴ G21G *5/00*
U.S. Cl. 250—492.2 **9 Claims**

1. Apparatus for ion implantation of semiconductor wafers comprising:

an ion implantation enclosure;

ion source means for directing a beam of ions into the ion implantation enclosure;

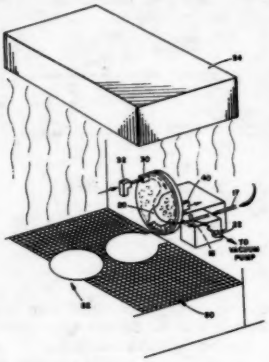
rotatably mounted wafer support means for moving wafers from a position outside the enclosure where wafers are loaded onto the support means to a position inside the enclosure where said wafers are rotated through the ion beam;

first valve means for coupling the enclosure to a pump for lowering the pressure in the enclosure;

second valve means for routing a fluid inside the enclosure;

drive means for rotating the wafer support means within the enclosure; and

control means to alternately open and close the first and second valve means while actuating the drive means to

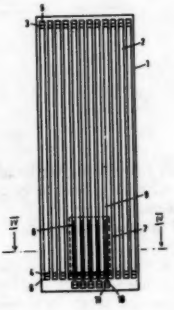


dislodge particle contaminants inside the enclosure and remove them from said enclosure.

4,703,184
SKIN TANNING APPARATUS

Friedrich Wolff, Störklingasse 38, CH-4125 Riehen/Basel, Switzerland

Filed Mar. 25, 1986, Ser. No. 844,009
Int. Cl.⁴ A61N *5/06*
U.S. Cl. 250—504 R **18 Claims**



1. Apparatus for transmitting radiation to the entire body of an adult, comprising a support; a plurality of first elongated tubular lamps each having a first end and a second end and each arranged to emit ultraviolet radiation primarily or exclusively in the UVA range with no emission in the UVC range, said lamps being mounted in said support in substantial parallelism with one another so that neighboring lamps define gaps of predetermined width; and means for intensifying radiation reaching the head of the person who is exposed to radiation issuing from said lamps including a plurality of second elongated tubular U-shaped lamps mounted on said support in selected ones of said gaps, each of said second lamps being shorter than a first lamp and said second lamps being adjacent the ends of said first lamps and being arranged to emit ultraviolet radiation primarily or exclusively in the UVA range with no emission in the UVC range, each of said second lamps having a diameter less than the width of a gap.

4,703,185

ARRANGEMENT FOR OPTICAL IMAGING OF TWO SUBJECTS LOCATED IN DIFFERENT OBJECT PLANES

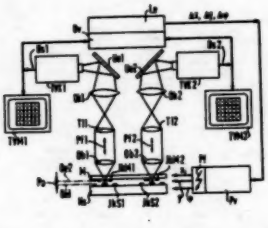
Herbert Eigenstetter, Planegg, and Peter Mengel, Eichenau, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 15, 1985, Ser. No. 798,411

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1984, 3446584

Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—548 19 Claims



1. An arrangement for imaging first and second subjects, located in respective first and second spaced object planes, comprising:

a housing including a stationary section, a displaceable section, and resilient connections joining said stationary and displaceable sections;

optical sensor means carried by said stationary sections;

at least one objective lens carried by said displaceable section and movable therewith relative to the first and second object planes; and

a positioning drive connected to and operable to displace said displaceable section.

4,703,186

HAND-HELD SCANNER WITH A SPEED CONTROL DEVICE

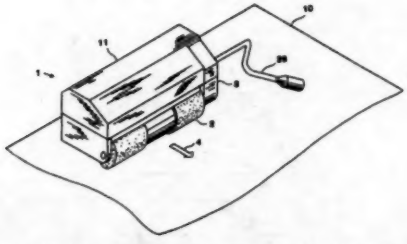
Nobuo Nakayama, Hirakata; Kenzi Nagamine, Kawachinagano; Kazuya Ueda, Nishinomiya, and Fuminari Saito, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 11, 1985, Ser. No. 753,966

Claims priority, application Japan, Jul. 12, 1984, 59-144629

Int. Cl.[4] G06K *7/10*

U.S. Cl. 250—566 16 Claims



1. A hand-held scanner moved on a document by a motive force given by an operator for inputting an image on the document, comprising:

a scanning unit comprising a light source for emitting light to irradiate the document, and means for converting reflected light from the document to electric signals;

a guide roller mounted on the scanning unit and rolling on the document by the motive force given by the operator to move the scanning unit; and

speed control means coupled to the guide roller for producing a resistance force in a direction opposite to the direction of rotation of the guide roller when the guide roller is rolled on the document and the speed of rotation of the guide roller exceeds a predetermined rotating speed thereby controlling the scanner to move at a constant speed.

4,703,187

METHOD AND APPARATUS FOR THE DETERMINATION OF THE THICKNESS OF TRANSPARENT LAYERS OF LACQUER

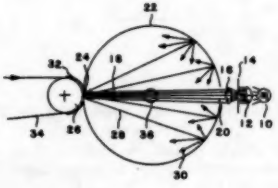
Erich Höfling, and Zdenek Maly, both of Kreuzlingen, Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 6, 1986, Ser. No. 836,763

Claims priority, application Switzerland, Mar. 15, 1985, 1171/85

Int. Cl.[4] G01J *1/00*

U.S. Cl. 250—571 10 Claims



1. A method of determining the thickness of a transparent layer of lacquer on a surface of a metal, wherein the optical transmission factor of said layer is determined, the improvement comprising directing light toward the lacquered metal surface and measuring the attenuation of irradiated light reflected from said metallic surface, which is disposed in arched configuration, in the infrared to visible range after transmission through the layer of lacquer.

4,703,188

POWER SOURCE FOR STARTER MOTORS

Mario H. Gottfried, Mexico City, Mexico, assignor to Power Group International Corp., Houston, Tex.

Filed Jan. 5, 1987, Ser. No. 499

Int. Cl.[4] F02N *11/04*

U.S. Cl. 290—38 B 18 Claims

1. A power source for a starter motor comprising:

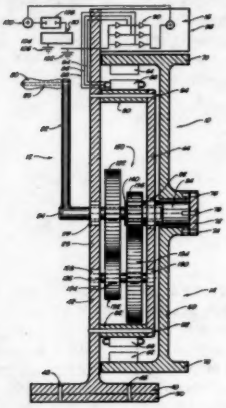
a frame:

hand crank means rotatably connected to said frame;

flywheel generator means connected to said hand crank, said flywheel generator means for creating an energy output relative to the rotation of said hand crank means; and,

power transmission means electrically connected to said flywheel generator means for transmitting energy from

said flywheel generator means to said starter motor, said power transmission means for converting said energy



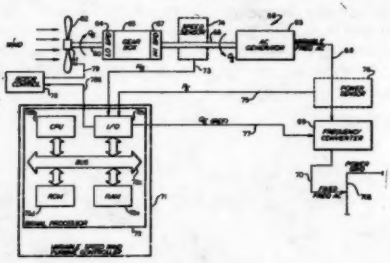
output of said flywheel generator means into a DC voltage.

4,703,189

TORQUE CONTROL FOR A VARIABLE SPEED WIND TURBINE

Eugene D. DiValentin, Enfield, and Henry S. Healy, Bloomfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 18, 1985, Ser. No. 799,046
Int. Cl.[4] F03D *9/00*
U.S. Cl. 290—44 **6 Claims**



1. A method for controlling the torque of a variable speed wind turbine-generator, comprising the steps of:

controlling, in response to sensed speed and power signals, the generator torque while operating below a torque limit of the wind turbine by providing a generator control signal for maneuvering the rotor tip speed at a selected constant velocity ratio with respect to wind speed; and

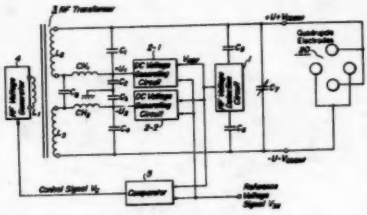
controlling, in response to sensed speed and power signals, the generator torque while operating above the torque limit of the wind turbine by providing a generator control signal for maneuvering the rotor tip speed at speeds greater than those dictated by the constant velocity ratio up to a speed or power limit.

4,703,190

POWER SUPPLY SYSTEM FOR A QUADRUPOLE MASS SPECTROMETER

Yoshikazu Tamura, and Katsuo Kitajima, both of Fuchu, Japan, assignors to Anelva Corporation, Tokyo, Japan

Filed Jun. 24, 1986, Ser. No. 877,923
Claims priority, application Japan, Jun. 25, 1985, 57-136856
Int. Cl.[4] H02J *1/00*
U.S. Cl. 307—2 **6 Claims**



1. A power supply system for a quadrupole mass spectrometer comprising:

means for generating RF (radio frequency) voltages;

means for dividing the RF voltages to produce subdivided RF voltages;

means for detecting the RF voltages to produce a detected voltage;

means for generating DC (direct current) voltages from the subdivided RF voltages obtained by said RF voltage dividing means, the subdivided RF voltages being rectified by the DC voltage generating means under control of the detected voltage while a proportional relationship is being maintained between the detected voltage and the resultant DC voltages; and

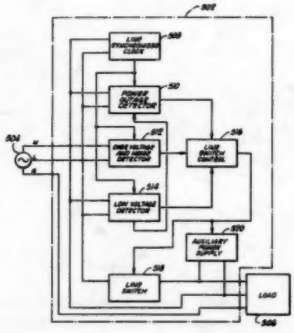
means for superimposing the resultant DC voltages over the RF voltages, the superimposed voltages being applied to the quadrupole mass spectrometer.

4,703,191

RESERVE POWER SOURCE WITH POWER FAILURE DETECTION APPARATUS

Frank T. Ferguson, Oklahoma City, Okla., assignor to Control Technology, Inc., Oklahoma City, Okla.

Filed Dec. 9, 1985, Ser. No. 806,800
Int. Cl.[4] H02H *3/28*
U.S. Cl. 307—64 **18 Claims**



1. An apparatus for detecting a power failure in an alternating current power signal, said apparatus comprising:

clock means for providing a clock signal in correspondence with a zero-crossing of said power signal, said clock signal

having cycles including a first state, existing for a first time, and a second state, existing for a second time, wherein said first and second times define the period of a cycle of said clock signal and wherein at least a portion of said second time defines a trip window portion of each cycle of said clock signal;

pulse generating means for generating a single control pulse commencing in response to a voltage level of said power signal detected prior to the zero-crossing of said power signal and terminating if a voltage level of said power signal is detected after the zero-crossing of said power signal; and

means, responsive to said clock signal and said control pulse, for detecting any part of said control pulse existing at the same time as any part of said trip window portion of said clock signal, which defines the existence of a power outage condition, and for generating a signal indicating a power outage in response to a detected power outage condition.

4,703,192

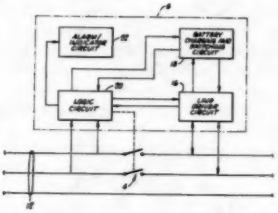
ALTERNATING CURRENT POWER SOURCE WITH IMPROVED PHASE ADJUSTING CAPABILITY

Frank T. Ferguson, Oklahoma City, Okla., assignor to Control Technology, Inc., Oklahoma City, Okla.

Continuation-in-part of Ser. No. 564,495, Dec. 22, 1983, Pat. No. 4,560,886. This application Sep. 13, 1985, Ser. No. 776,032

Int. Cl.[4] H02J *9/06*

U.S. Cl. 307—64 **14 Claims**



12. An improved alternating current power source for use with an electrical load which is connectible to a primary power source through an electrical transmission system, said alternating current power source comprising:

switch means, connectible with said electrical transmission system between said primary power source and said load, for opening and closing an electrical circuit provided between said primary power source and said load by said electrical transmission system;

amplifier means for providing a transformer driving signal;

transformer means having a first winding and a second winding, said first winding electrically connectible to said electrical transmission system between said switch means and said load so that a primary alternating current voltage signal from said primary power source appears across said first winding when said switch means closes said electrical circuit and said first winding is connected to said electrical transmission system, and said second winding electrically connected to said amplifier means so that said transformer driving signal creates an auxiliary alternating current voltage signal across said first winding when said switch means opens said electrical circuit;

monitoring means for monitoring said primary alternating current voltage signal and said auxiliary alternating current voltage signal;

pulse width modulation means, including a first input connected to said monitor means and including a first output connected to said amplifier means, for providing a pulse width modulated signal through said output to said amplifier means in response to said monitoring means, said pulse width modulation means further including:

a second input;

a second output;

sensing means, connected to said transformer means and to said second output, for sensing a phase-switching condition, wherein said primary alternating current voltage signal and said auxiliary alternating current voltage signal provide a current which tends to saturate said transformer means, and for providing a phase-switching control signal to said second output when said phase-switching condition is sensed;

toggle means, having a toggle input and having toggled outputs connected to said amplifier means, for operating said amplifier means so that said transformer driving signal alternates between two polarities; and

oscillator means, having a oscillator output connected to said toggle input and to said second input, for providing an actuating signal to said toggle means; and

diode means for connecting said second input with said second output so that said phase-switching control signal overrides said actuating signal.

4,703,193

APPARATUS FOR CONTROLLING THE PARALLEL OPERATION OF AN A-C OUTPUT CONVERTER FOR A COMMERCIAL POWER SOURCE INCLUDING A CIRCUIT FOR SIMULATING OUTPUT CURRENT FOR TEST PURPOSES

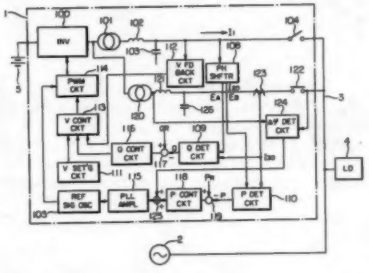
Takao Kawabata, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 28, 1986, Ser. No. 901,273

Claims priority, application Japan, Aug. 30, 1985, 60-191337

Int. Cl.[4] H02J *9/00*

U.S. Cl. 307—66 **4 Claims**

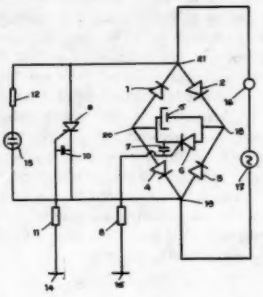


1. An apparatus for controlling the parallel operation of a commercial power source and an A-C output converter of a variable voltage and a variable frequency said apparatus comprising simulated output current detecting circuit means including an impedance element provided between said commercial power source and an output terminal of at least one phase which represents an internally generated voltage of the A-C output converter, said impedance element being connected in parallel with an output impedance of a main circuit of the A-C output converter which is connected at an output to the commercial power source, said simulated output current detecting circuit means including means operable independently of the main circuit to selectively activate said detecting circuit means and cause a simulated output current to flow through said impedance element, and means for controlling the voltage and frequency of the A-C output converter so that the simulated output current that flows through said impedance element assumes a predetermined value.

4,703,194
TOUCH OPERATED ELECTRONIC SWITCH FOR ALTERNATING CURRENT

Jacques C. J. Brovelli, Molières sur Cèze, France, assignor to Philiffe J. H. Berna, Molieres-sur-Cèze, France

Filed Aug. 26, 1985, Ser. No. 768,761
Int. Cl.[4] H01H *35/00*
U.S. Cl. 307—116 6 Claims



1. A touch operated electronic switch for alternating current comprising in combination only

a full wave rectifying bridge having one pole of its input connected to a load such as a lamp or a relay and the other pole of said input connected to an A.C. potential source,

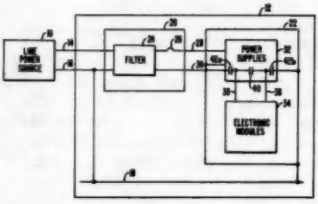
a first unidirectional conducting device such as a silicon controlled rectifier, mounted in parallel with said bridge output from the plus to the minus poles thereof, said first unidirectional conducting device being coupled to a reactance circuit element and

a second unidirectional conducting device such as a silicon controlled rectifier mounted in parallel with said bridge input from the pole thereof connected to the load to the other pole thereof connected to said A.C. potential source.

4,703,195
PARALLEL GROUNDING SCHEME

Carl J. Bailey, San Jose, Calif., assignor to Tandem Computers Incorporated, Cupertino, Calif.

Continuation of Ser. No. 829,751, Feb. 14, 1986, abandoned, which is a continuation of Ser. No. 551,280, Nov. 14, 1983, Pat. No. 4,621,199. This application Sep. 5, 1986, Ser. No. 904,770
Int. Cl.[4] H02H *3/00*
U.S. Cl. 307—147 6 Claims



1. In an electronic system that is supplied a line power and a line ground by a line power means, the system having a frame electrically coupled to the line ground, a grounding scheme comprising:

a card cage electrically coupled to the frame, said card cage receiving an electronic module;

power supply means for providing power and ground to the electronic module, said power supply means being coupled to the electronic module and housed within said card cage;

coupling means for electronically coupling said power supply means to the line power means;

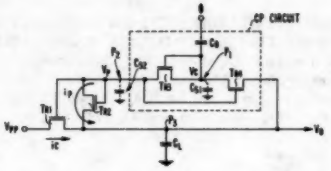
a first ground path means electrically coupling the line ground to said power supply means; and

a second ground path means formed by said card cage and the frame electrically coupling the line ground to said power supply means in parallel with said first ground path means so as to decrease the amount of radiated noise.

4,703,196
HIGH VOLTAGE PRECHARGING CIRCUIT

Hideki Arakawa, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 8, 1985, Ser. No. 763,628
Claims priority, application Japan, Aug. 13, 1984, 59-169060
Int. Cl.[4] H03K *17/56, 3/01*
U.S. Cl. 307—246 12 Claims



1. A precharging circuit for charging a precharging node to a high voltage level, relative to ground potential, from a high voltage source under control of a series of clock pulses, successive clock pulses being separated by corresponding interim time intervals and each clock pulse having a leading edge and a trailing edge defining therebetween a corresponding clock pulse time interval, comprising:

a precharging capacitor connected between said precharging node and ground for developing a voltage at the precharging node having a level which incrementally increases to a high voltage level approaching that of the high voltage source;

a first MIS transistor having a gate, a source and a drain, one of said source and drain being operatively connected to the high voltage source and the other of said source and drain being operatively connected to said precharging node, said first MIS transistor having a predetermined threshold voltage for conduction;

a further node;

a charge-pump circuit operatively connected between said precharging node and through said further node to said gate of said first MIS transistor;

means for applying a series of clock pulses to said charge-pump circuit, said charge-pump circuit responding to each of said clock pulses to generate a voltage at said further node which has a higher level than the predetermined threshold voltage for conduction of said first MIS transistor, relative to the currently existing voltage level at said precharging node, thereby to turn said first MIS transistor on and permit a flow of charging current therethrough from said high voltage source to said precharging capacitor thereby to produce an increase in the voltage level at the precharging node; and

voltage suppressing means having a predetermined threshold value for operation and operatively connected between said further node and said precharging node and responsive to said higher level voltage at said further node exceeding the voltage at said precharging node by said predetermined threshold value for operation of said voltage suppressing means so as to reduce the voltage level at said further node and turn said first MIS transistor off, said

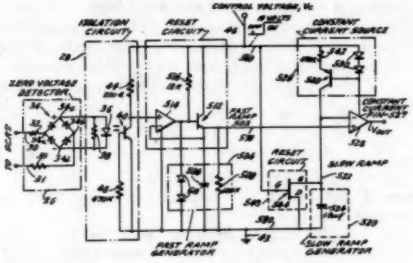
first MIS transistor thus being turned on only for a portion of the respective clock pulse time interval of each of successive clock pulses applied to said charge-pump circuit to permit corresponding, incremental flows of charging current to said precharging capacitor for charging said precharging node to a voltage level approaching that of said high voltage source.

4,703,197

PHASE-CONTROLLED POWER SWITCHING CIRCUIT

Kenneth H. Fleischer, Los Angeles, Calif., assignor to International Rectifier Corporation, Los Angeles, Calif.

Filed May 28, 1986, Ser. No. 867,533
Int. Cl.[4] H03K 17/72
U.S. Cl. 307—646 **32 Claims**



1. A power switching circuit for applying alternating current power to an electrical load; the alternating current power being characterized as having a voltage waveform with zero crossings at half cycles, said power switching circuit comprising:

a gatable switching means for connecting an alternating current power source to an electrical load and having the property of being turned off by voltage commutation;

means for generating a first signal commencing at an initial value at a zero voltage crossing and changing towards a final value;

reset means for resetting said first signal to said initial value, said resetting occurring no later than one of the half-cycles after said first signal is at said initial value;

means for generating a second signal that is changeable in value at least between said initial and final values of said first signal;

comparator means responsive to said first and second signals for detecting the occurrence of said first and second signals having their difference change in polarity to a predetermined polarity; and

gate drive means responsive to said comparator means for gating said switching means into conduction at each respective instant when said first and second signals have their difference change in polarity to said predetermined polarity.

4,703,198

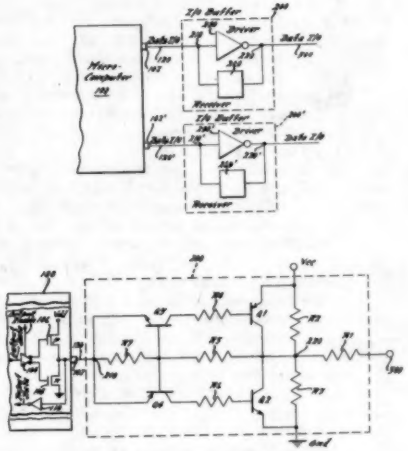
BI-DIRECTIONAL DATA TRANSFER CIRCUIT THAT IS DIRECTIONALLY RESPONSIVE TO THE IMPEDANCE CONDITION OF AN ASSOCIATED INPUT/OUTPUT PORT OF A MICROCOMPUTER

Frederick J. Porter, Farmington Hills, and Richard A. Pidsosny, Canton, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jul. 7, 1986, Ser. No. 883,264
Int. Cl.[4] H03K 19/017, 19/094, 17/04, 17/687
U.S. Cl. 307—473 **5 Claims**

1. An impedance sensing circuit for connection to an input-/output port of a microcomputer to provide bi-directional data transfer between the input/output port and an associated data bus, comprising:

means coupled to said input/output port for providing a low impedance and relatively low voltage level condition on said input/output port to provide a relatively high voltage level output to said associated data bus and actively responsive to a low impedance and relatively high voltage



level condition on said input/output port to provide a relatively low voltage level output to said associated data bus; and

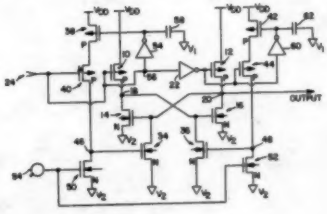
means coupled to said input/output port for providing passively responsive to a high impedance condition on said input/output port to communicate relatively high and relatively low voltage levels from said associated data bus to said port.

4,703,199

NON-RESTRICTED LEVEL SHIFTER

Glenn L. Ely, San Jose, Calif., assignor to Intersil, Inc., Cupertino, Calif.

Filed Apr. 3, 1985, Ser. No. 719,478
Int. Cl.[4] H03K 19/00, 19/08
U.S. Cl. 307—264 **12 Claims**



1. A voltage level shifter comprising:

first and second power terminals for the application therebetween of an operating voltage;

an input terminal for the application thereto of an input signal whose amplitude is less than the amplitude of the operating voltage;

first and second output terminals for producing thereat first and second complementary signals, respectively, whose

amplitude range between the voltages at said first and second power terminals;

first and second inverting means, each one of said inverting means including a first transistor of one conductivity type and a second transistor of second conductivity type; each transistor having first and second electrodes defining the ends of a conduction path and a control electrode; means connecting the conduction path of the first transistor of said first inverting means between said first power terminal and said first output terminal and the conduction path of said second transistor of said first inverting means between said first output terminal and said second power terminal; means connecting the conduction path of said first transistor of said second inverting means between said first power terminal and said second output terminal and the conduction path of said second transistor of said second inverting means between said second output terminal and said second power terminal;

means coupled between said input terminal and the control electrode of said first transistor of said first inverting means for applying thereto said input signal; and means coupled between said input terminal and the control electrode of said first transistor of said second inverting means for applying thereto the complement of said input signal;

means connecting the control electrode of the second transistor of the first inverting means to said second output terminal and the control electrode of the second transistor of the second inverting means to said first output terminal;

a first conductive means responsive to the signal applied to the control electrode of said first tranistor of said first inverting means coupled to the control electrode of said second transistor of said first inverting means for tending to turn-off said second transistor of said first inverting means when said input signal makes a transition of a polarity and magnitude to turn-on said first transistor of said first inverting means; and

a second conductive means responsive to the signal applied to the control electrode of said first transistor of said second inverting means coupled to the control electrode of said second transistor of said second inverting means for tending to turn-off said second transistor of said second inverting means when said input signal makes a transition of a polarity and magnitude to turn-on said first transistor of said second inverting means.

4,703,200

STATIC BISTABLE FLIP-FLOP CIRCUIT OBTAINED BY UTILIZING CMOS TECHNOLOGY

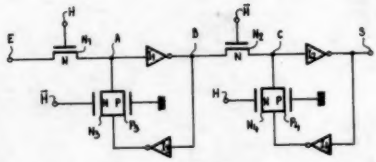
Louis Zangara, Seyssins, France, assignor to Societe pour l'Etude de la Fabrication des Circuits Integres Speciaux - E.F.-C.I.S., Grenoble, France

Filed Feb. 25, 1986, Ser. No. 832,662

Claims priority, application France, Feb. 28, 1985, 85 02972

Int. Cl.[4] H03K *3/037, 3/356, 17/04, 19/017*

U.S. Cl. 307—279 **5 Claims**



1. A static bistable flip-flop circuit, produced by CMOS technology, comprising an input, an output, a first inverter, a first switch connecting the input of the flip-flop to the input of the first inverter, a second inverter, a second switch connecting the output of the first inverter to the input of the second inverter, a third inverter, a third switch connecting the output of the third inverter to the input of the first inverter, a fourth inverter, a fourth switch connecting the output of the fourth inverter to the input of the second inverter; the output of the first inverter being connected to the input of the third inverter, the output of the second inverter being connected to the input of the fourth inverter; the first switch and the fourth switch being simultaneously controlled by a first clock signal and the second and the third switches being simultaneously controlled by a second clock signal in phase opposition with the first, wherein:

each switch is constituted by a single field effect N channel transistor, the gate of first and fourth switches is controlled by the first clock signal and the gate of second and third switches is controlled by the second clock signal;

and including two MOS P channel transistors, the first P channel transistor being placed in parallel with the third switch and having its gate connected to a first circuit connecting point so that it is conductive at least when the output of the first inverter is at a low logic level, and the second P channel transistor being placed in parallel with the fourth switch and having its gate connected to a second circuit connecting point so that it is conductive at least when the output of the second inverter is at a low logic level.

4,703,201

CMOS SCHMITT TRIGGER

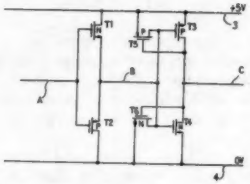
Joseph M. McGrail, Ipswich, England, assignor to British Telecommunications plc, Great Britain

Filed Aug. 14, 1985, Ser. No. 765,491

Claims priority, application United Kingdom, Aug. 14, 1984, 8420651

Int. Cl.[4] H03K *3/29, 3/26, 19/094, 17/687*

U.S. Cl. 307—290 **6 Claims**



1. A Schmitt trigger comprising:

a first p-channel MOSFET (T2) whose drain is connected to a ground rail and a first n-channel MOSFET (T1) whose drain is connected to a voltage supply rail positive with respect to said ground rail, whose gates are connected to a common input, and whose sources are connected together, said first p-channel MOSFET and said first n-channel MOSFET forming a non-inverting configuration;

a second p-channel MOSFET (T3) whose source is connected to said voltage supply rail, and whose gate is connected to the source of said first p-channel MOSFET (T2), and a second n-channel MOSFET (T4) whose source is connected to the ground rail, whose gate is connected to the gate of the second p-channel MOSFET (T3) and whose drain is connected to the drain of the second p-channel MOSFET (T3) to form a common output, said second p-channel MOSFET and said second n-channel MOSFET forming an inverting configuration;

a third p-channel MOSFET (T5) whose source is connected to said voltage supply rail, whose drain is connected to the gate of the second p-channel MOSFET (T3) and whose gate is connected to the drain of the second p-channel MOSFET (T3); and

a third n-channel MOSFET (T6) whose source is connected to said ground rail, whose drain is connected to the gate of the second n-channel MOSFET (T4) and whose gate is

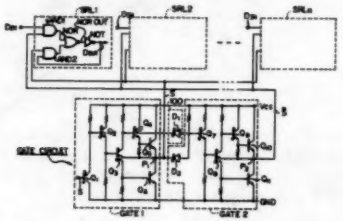
connected to the drain of the second n-channel MOSFET (T4).

4,703,202

TWO-STAGE GATE CIRCUIT PROVIDING INVERTED AND NON-INVERTED OUTPUTS

Hiromu Enomoto, Kawasaki; Yasushi Yasuda, Machida; Akinori Tahara, Zushi, and Masao Kumagai, Tokyo, all of Japan, assignors to Fujitsu Limited, Kanagawa 211, Japan

Filed Feb. 11, 1985, Ser. No. 700,413
Claims priority, application Japan, Feb. 13, 1984, 59-022966
Int. Cl.⁴ H03K *19/013, 19/088*
U.S. Cl. 307—443 **11 Claims**



1. A gate circuit for generating an inverted signal and a non-inverted signal of an input signal, comprising:

a first-stage gate circuit having a phase splitter transistor operatively coupled to an input terminal for receiving said input signal and for reacting to a change of a level of said input signal and an output circuit controlled by said phase splitter transistor and for outputting at the output terminal thereof said inverted signal;

a second-stage gate circuit having an input terminal operatively coupled to said output terminal of the output circuit of said first-stage circuit for receiving said inverted signal of said first-stage gate circuit and for outputting said non-inverted signal; and

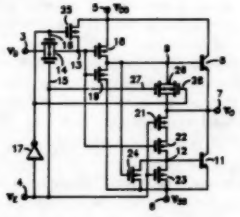
means, connected between a collector of said phase splitter transistor in said first-stage gate circuit and an input terminal in said second stage gate circuit, for controlling a level at said input terminal in said second-stage gate circuit according to a level of said collector of said phase splitter transistor in said first-stage gate circuit.

4,703,203

BICMOS LOGIC HAVING THREE STATE OUTPUT

Michael G. Gallup, Austin, Tex., and Kevin L. McLaughlin, Chandler, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 3, 1986, Ser. No. 914,970
Int. Cl.⁴ H03K *19/017*
U.S. Cl. 307—446 **5 Claims**



1. A BICMOS logic circuit comprising:

a first input terminal;

a second input terminal;

an output terminal;

a first voltage terminal;

a second voltage terminal;

a first bipolar transistor having its collector-emitter path coupled between said first voltage terminal and said output terminal and having a base;

a second bipolar transistor having its collector-emitter path coupled between said output terminal and said second voltage terminal and having a base;

a first CMOS transistor having its source-drain current path coupled between said first voltage terminal and said base of said first bipolar transistor and a gate;

a second CMOS transistor having its source-drain current path coupled between said said base of said first bipolar transistor and said second voltage terminal and a gate;

a third CMOS transistor having a gate, a source and a drain;

a fourth CMOS transistor having its source-drain current path coupled between said base of said second bipolar transistor and said second voltage terminal and a gate coupled to said base of said first bipolar transistor;

first transmission means coupled between said first input terminal and said gates of said first, second, and third CMOS transistors and coupled to said second input terminal for coupling said first input terminal to said gates of said first, second and third CMOS transistors in response to an input signal on said second input terminal;

a fifth CMOS transistor having its source-drain current path coupled between said first voltage terminal and said gate of said first CMOS transistor and a gate coupled to said second input terminal;

a sixth CMOS transistor having its source-drain current path coupled to said source-drain current path of said third CMOS transistor, said source-drain current paths of said third and sixth CMOS transistors coupled between said output terminal and said base of said second bipolar transistor, and a gate coupled to said second input terminal; and

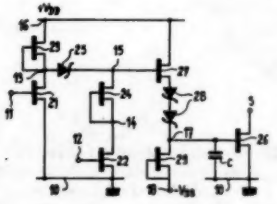
a seventh CMOS transistor having its source-drain current path coupled between said base of said second bipolar transistor and said second voltage terminal and a gate coupled to said said second input terminal.

4,703,204

LOGIC COINCIDENCE GATE AND LOGIC SEQUENTIAL CIRCUITS USING SAID COINCIDENCE GATE

Ngu T. Pham, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 11, 1985, Ser. No. 807,731
Claims priority, application France, Dec. 14, 1984, 84 19194
Int. Cl.⁴ H03K *19/017, 19/02, 19/094, 19/092*
U.S. Cl. 307—448 **9 Claims**



1. A logic coincidence gate comprising:

two first and second transistors, where both sources are grounded and where the gates of said first and second transistors constitute the inputs of said logic gate and where the drains of each of said first and second transistors are connected to first and second resistors, wherein said first and second resistors are identical saturated resistors and wherein the first saturated resistor and said first transistor are supplied from a fixed voltage source, and further where the second saturated resistor and said sec-

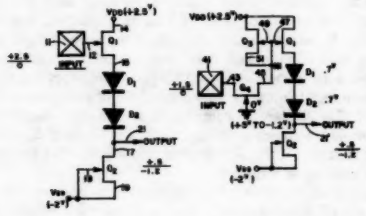
ond transistor are supplied across a Schottky diode, connected in a conductive sense, from the common point of the first saturated resitor and the drain of the first transistor, the common point of the Schottky diode and the second saturated resistor constituting the output of the logic coincidence gate.

4,703,205

UNCOMPENSATED AND COMPENSATED GALLIUM ARSENIDE INPUT RECEIVERS

Gary L. Heimbigner, Anaheim, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 26, 1985, Ser. No. 759,193
Int. Cl.[4] H03K *19/094, 17/30*
U.S. Cl. 307—450 **6 Claims**



1. An input receiver for gallium arsenide circuits, comprising in combination:

a voltage level shifter circuit for connection between sources of supply voltage comprising a depletion FET follower device having a gate, level shifting diodes and a pull down depletion FET, all of the depletion FET follower device, diodes and pull down depletion FET connected in series, with an output connection between the diodes and the pull down FET;

a common gate amplifier depletion FET for receiving an output signal on its source;

said amplifier FET having a gate held at a fixed potential between the supply voltages, and having a drain;

a pull up device connected between the drain of the amplifier FET and one of said voltage sources whereby when the input signal voltage level rises about the fixed voltage to cut off the amplifier FET, the voltage at the drain of said amplifier FET rises to almost that of said one source; and,

a connection from the amplifier FET drain to the gate of the follower depletion FET to increase the voltage level shifter output voltage.

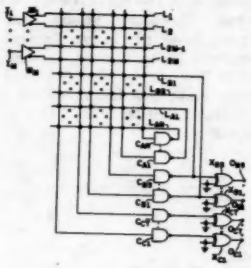
4,703,206

FIELD-PROGRAMMABLE LOGIC DEVICE WITH PROGRAMMABLE FOLDBACK TO CONTROL NUMBER OF LOGIC LEVELS

Napoleone Cavlan, Cupertino, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Nov. 19, 1985, Ser. No. 799,676
Int. Cl.[4] H03K *19/177*
U.S. Cl. 307—465 **20 Claims**

1. A programmable logic device having: a plurality of primary lines, at least part of which are input lines for receiving external input data; an array of primary logic gates, each gate having (1) a plurality of input sections of which each is connected to a different one of the primary lines and (2) an output section for providing an output signal as either the logical NAND or the logical NOR of the input data to that gate; and means for selectively programmably connecting each input section of each gate to its output section; characterized in that at least part of the gates are foldback gates whose output



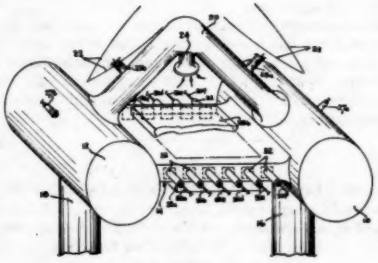
sections are respectively connected to corresponding foldback lines consisting of part of the primary lines exclusive of the input lines, whereby each foldback line receives the output signal from the corresponding foldback gate.

4,703,207

ALTERNATING CURRENT MAGNETO HYDRODYNAMIC GENERATOR

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Jul. 25, 1985, Ser. No. 758,763
Int. Cl.[4] H02K *44/00*
U.S. Cl. 310—11 **6 Claims**



1. A magnetohydrodynamic alternating current generator comprising a coupled pair of combustion chambers:

means for providing an intake of a combustion mixture to each of said chambers;

means for providing an exhaust for each of said chambers;

said chamber being acoustically coupled for alternately igniting the fuel mixture in each of said chambers in 180 degree phase relationship;

a narrow neck portion forming a channel for carrying gas between said chambers;

pole piece means positioned alongside said channel for providing magnetic flux across the channel, and

means for picking off an alternating electric current from said channel, said current being generated by virtue of the alternate propulsion of unitary masses of ionized gas through said channel between said chambers successively in opposite directions.

4,703,208

WRISTWATCH STEPPING MOTOR

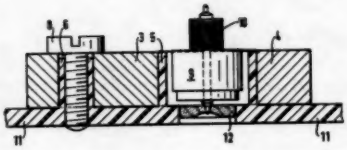
Wolfgang Burkhardt, Ispringen, and Wolfgang Kröner, Pforzheim, both of Fed. Rep. of Germany, assignors to Pforzheimer Uhren-Rohwerke PORTA G.m.b.H, Pforzheim, Fed. Rep. of Germany

Filed May 12, 1986, Ser. No. 861,847

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522689

Int. Cl.[4] H02K *37/00*

U.S. Cl. 310—49 R 5 Claims



1. A wristwatch stepping motor comprising a support plate, a rotor and an armature with a magnetic coil supported on said support plate, a collar projecting from said support plate and extending around said rotor, said armature consisting of two essentially L-shaped armature portions each having a long and a short leg and being mounted on said support plate so as to form together an essentially rectangular armature with four corner areas, the long leg of one of the L-shaped armature portions being straight and of uniform cross-section and forming a coil core adapted to facilitate reception of said magnetic coil and being disposed at its free end in intimate abutment with the short leg of the other of said L-shaped armature portions so as to form a first corner area adapted to facilitate passage of magnetic flux, the short leg of the one and the long leg of the other L-shaped armature portions being separated in the corner area diagonally opposite said first corner area and shaped so as to form pole structures engaging therebetween said collar for firmly positioning said armature portions at the pole structure ends thereof, each armature portion having a bolt extending therethrough spaced from said collar for mounting said armature portions on said support plate.

4,703,209

ELECTRIC MOTOR, ESPECIALLY COLLECTORLESS D.C. MOTOR, WITH AN OUTSIDE ROTOR

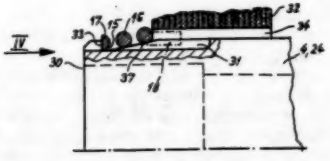
Guenter Wrobel, Villingen, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

Filed Apr. 30, 1986, Ser. No. 857,474

Claims priority, application Switzerland, Apr. 30, 1985, 01814/85

Int. Cl.[4] H02K *7/00*

U.S. Cl. 310—67 R 26 Claims



1. An electric motor comprising outside rotor means, stator means, printed circuit board means, fastening means for fastening the printed circuit board means at an end face of the stator means, and bearing support means operatively connected with a fastening flange, the stator means being mounted with a sliding seat on the outer surface of the bearing support means, and a spring means for securing the stator means axially and against rotation.

4,703,210

MINIATURE ELECTRIC NON-UNIFORM MAGNETIZATION ROTATING MACHINE

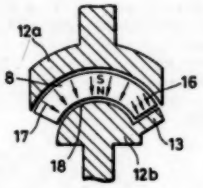
Toshimi Abukawa, Hitachi-Oota; Kazuo Tahara; Noriyoshi Takahashi, both of Hitachi, and Toshio Tomite, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 9, 1986, Ser. No. 905,158

Claims priority, application Japan, Sep. 18, 1985, 60-204280

Int. Cl.[4] H02K *1/06, 21/26*

U.S. Cl. 310—154 4 Claims



1. In a miniature electric non-uniform magnetization rotating machine including a rotor and a stator equipped with at least one field pole disposed on a peripheral circle of said rotor, the improvement wherein said at least one field pole includes one permanent magnet having a length extending in an axial direction of said rotor, said permanent magnet comprising an anisotropic magnet having a magnetizing side and a demagnetizing side having end portions extending in the axial direction of said rotor, said anisotropic magnet having two magnetizing directions arranged such that a first anisotropic direction extends transversely at a predetermined angle to a surface of one end portion on said demagnetizing side along substantially the entire length of said surface, and a second anisotropic direction on both said magnetizing and demagnetizing sides which extends towards the center of said rotor.

4,703,211

SLOTLESS BRUSHLESS DC MOTOR

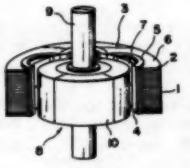
Asao Yazaki, Shimoina; Takashi Sunaba, and Yoshihiro Takemura, both of Komagane, all of Japan, assignors to Shinano Tokki Corporation, Nagano, Japan

Filed Jul. 24, 1986, Ser. No. 890,700

Claims priority, application Japan, Nov. 21, 1985, 60-259670

Int. Cl.[4] H02K *1/00*

U.S. Cl. 310—179 7 Claims



1. A slotless brushless DC motor comprising;

a stator core enclosing a cylindrical space and having a cylindrical inner surface and end faces;

a permanent magnet rotor, having at least one magnetic pole pair, rotatively supported so as to rotate within the cylindrical space enclosed by the stator core;

an insulating cover fixed to the stator core so as to cover the cylindrical inner surface and the end faces of the stator

core, and said insulating cover having protrusions formed in the inner cylindrical surface;

a plurality of single layer coils fixed to the inner surface of the insulating cover such that the position of the single layer coils is determined by the protrusions with respective adjacent single layer coils in contact with each other and said single layer coils having coil ends being bent and fixed to the insulating cover covering the end faces of the stator core.

4,703,212

DIRECT-CURRENT MOTOR

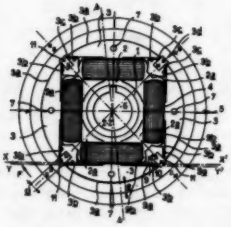
Simon Aboukrat, Garges lès Gonesse; Lucien Catoir, Clichy; Jean-Luc Guatelli, Montigny lès Cormeilles, and Janusz Sobiepanek, Gif sur Yvette, all of France, assignors to Etudes Techniques et Representations Industrielles E.T.R.I., Neuilly-sur-Seine, France

Filed Oct. 29, 1985, Ser. No. 793,101

Claims priority, application France, Oct. 31, 1984, 84 16679

Int. Cl.[4] H02K *1/18*

U.S. Cl. 310—218 **9 Claims**



1. A direct-current motor comprising a permanent magnetism element which is provided opposite to an annular air-gap with at least two regions having opposite permanent magnetic polarities and which is mounted for rotational motion relative to an electromagnetic element comprising at least one winding and at least one yoke connected by means of arms to at least two adjacent pole horns located opposite to said air gap such that at least one of said arms is surrounded by said at least one winding, the motor comprising in addition a plurality of auxiliary permanent magnets each of which is positioned within a space between two adjacent circumferential ends of two adjacent pole horns, said ends being directed towards each other, each of said auxiliary permanent magnets being carried by a post accommodated within an inter-pole space provided between said yoke and said two adjacent horns, wherein the posts are carried by an annular plate mounted against an axial end face of the horns.

4,703,213

DEVICE TO OPERATE A PIEZOELECTRIC ULTRASONIC TRANSDUCER

Herbert Gäsler, Rotweg 4, D-7909 Bollingen, Fed. Rep. of Germany

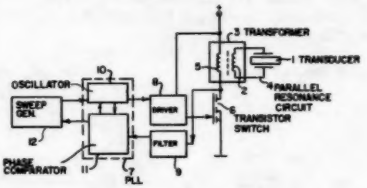
Continuation-in-part of Ser. No. 686,398, Dec. 26, 1985, abandoned. This application Jul. 15, 1986, Ser. No. 885,767

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1984, 3401735

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—316 **6 Claims**

1. A device to operate a Piezoelectric Ultrasonic Transducer especially for atomizing fluids comprising a driving circuit having a PLL controlled oscillator for the generation and having a transformer for the transmission of the driving energy for the transducer; means for tapping from the primary winding of the transformer a measured quantity necessary to control the oscillator and supplying said measured quantity to said PLL; means for supplying the transducer (1) with driving energy in short pulses each having a duration of less than one fourth of an oscillation of the mechanical resonant frequency of said transducer; means for cutting off the driving circuit the time between these short pulses; a parallel resonant circuit (4) comprising the inductance (1) of the secondary winding of the



transformer (2) and the operating-impedance of the transducer in which the transducer vibrates at its mechanical resonant frequency in a free oscillation during the time between the short pulses; the varying transducer-voltage being tapped from a winding of the transformer as a measured quantity to supply the transducer circuit with the energy-pulses in proper phase.

4,703,214

ULTRASONIC VIBRATOR AND ITS DRIVE CONTROL METHOD

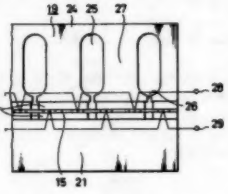
Shoji Mishiro, Kanagawa, Japan, assignor to Taga Electric Co., Ltd., Tokyo, Japan

Filed Sep. 30, 1986, Ser. No. 913,754

Claims priority, application Japan, Nov. 27, 1985, 60-266617; Dec. 24, 1985, 60-291732; Jan. 23, 1986, 61-12822; Apr. 21, 1986, 61-91880

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—328 **8 Claims**



1. An ultrasonic vibrator comprising:

an electrostrictive element body polarized in a thickness direction thereof;

a plurality of electrode pairs circumferentially arranged on one surface of the electrostrictive element body, each said electrode pair comprising electrodes halves spaced in a circumferential direction of said electrostricting element body and a common electrode formed on other surface thereof; and

a vibrator member and a metal member rigidly holding at least one said electrostrictive element body therebetween;

wherein said vibrator member is divided in the circumferential direction thereof by a dividing number coincident with the number of said electrode pairs to form foot portions.

4,703,215

STACKED PIEZOELECTRIC CERAMICS DISPLACEMENT MAGNIFYING DEVICE

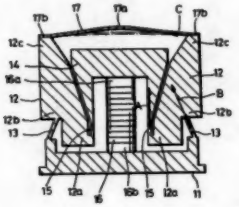
Hitoshi Asano, Obu, Japan, assignor to Aisan Kogyo Kabushiki Kaisha, Obu, Japan

Filed Feb. 4, 1987, Ser. No. 10,737

Claims priority, application Japan, Mar. 13, 1986, 61-036641[U]

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—328 6 Claims



1. A stacked piezoelectric ceramics displacement magnifying device comprising:

a base member;

a stacked piezoelectric ceramics fixed at its one end to said base member, said stacked piezoelectric ceramics being expandable upon application of an electric field thereto;

a lever member having an inner end portion for receiving an expansion force from said stacked piezoelectric ceramics, at least two outer end portions adapted to be outwardly displaced when said inner end portion receives said expansion force from said stacked piezoelectric ceramics, and a fulcrum portion connected through a hinge to said base member, said hinge being formed of a thin plate unexpandable in its longitudinal direction and being arranged in parallel to a direction of a resultant of forces acting to said inner end portion and said outer end portion of said lever member;

a connection member for connecting the other end of said stacked piezoelectric ceramics to said inner end portion of said lever member; and

a flexing member formed of an elongated elastic material and connected at its both ends to said outer end portions of said lever member under the condition where a central portion thereof is flexed.

4,703,216

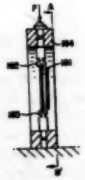
OSCILLATING CRYSTAL TRANSDUCER SYSTEMS

James P. Corbett, 923, Palermo Dr., Santa Barbara, Calif. 93105

Continuation-in-part of Ser. No. 775,353, Sep. 12, 1985. This application Feb. 28, 1986, Ser. No. 834,383

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—338 17 Claims



1. A force transducer comprising:

a plate-shaped piezo-electric crystal having a peripheral edge,

a first pair of electrodes disposed on a corresponding region on opposite sides of a first portion of the crystal,

a second pair of electrodes disposed on a corresponding region on opposite sides of a second portion of the crystal,

means for energising the electrode pairs to maintain oscillation of the first and second crystal portion,

a substantial member, other than the crystal, which sustains the majority of the force to be measured by the transducer,

bonding of one or more pairs of opposing sections of the edge of the crystal, each opposing section of which is in the vicinity of a line through an electrode pair, to at least one portion of said substantial member such that the maximum force to be measured is not less than twice as great as the maximum force which could be sustained by the crystal alone without mechanical failure of the crystal.

4,703,217

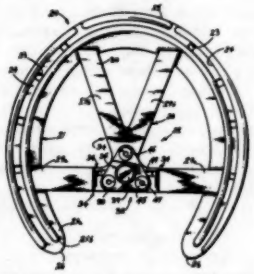
ELECTRONIC ANIMAL HOOF FORCE DETECTION SYSTEMS

Marc H. Ratzlaff, Moscow, Id.; John M. Frame, and Barrie D. Grant, both of Pullman, Wash., assignors to Washington State University Research Foundation, Pullman, Wash.

Filed May 23, 1986, Ser. No. 866,875

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—338 28 Claims



1. An animal hoof force detection apparatus comprising:

a substantially rigid shoe having a ground-contacting surface and a hoof-directed surface, said shoe being adapted for mounting upon a hoof of a hoofed animal; said shoe having at least one sensor mounting section which is connected to at least one adjacent remaining portion of said shoe using a flexion joint integrally connecting said sensor mounting section to the adjacent remaining portion of said shoe while allowing flexure of the sensor mounting section with respect to the remaining portion when weight is applied through the force detection apparatus;

at least one piezoelectric element connected to the shoe at said sensor mounting section; said piezoelectric element having at least first and second sensing faces which are oriented to sense force applied therethrough.

4,703,218

PIEZO-ELECTRIC ASSEMBLY

Hiroyuki Takahashi, Takaoka, and Isao Toyoshima, Ishikawa, both of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Oct. 30, 1986, Ser. No. 925,827

Claims priority, application Japan, Nov. 6, 1985, 60-249414

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—348 5 Claims

1. In a piezo-electric assembly which comprises

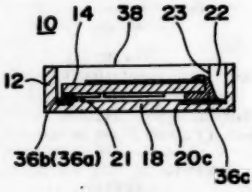
a case including a bottom portion having a bottom interior surface; at least one internal terminal means having a top surface substantially flush with said bottom interior surface; at least one corresponding external terminal means outside said case; and at least one connector means extend-

ing through the bottom portion and electrically interconnecting said internal terminal means and said corresponding external terminal means;

a piezo-electric element accommodated in said case, said element having at least one main electrode at a bottom surface thereof to be connected to said at least one internal terminal means; and

a quantity of flowable conductive adhesive material applied between the main electrode and the internal terminal means for conductively adhering the same;

the improvement comprising:



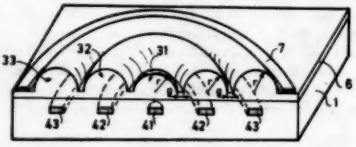
a ridge-shaped bulkhead formed on said bottom interior surface and traversing substantially the entire bottom interior surface in the vicinity of said internal terminal means and said main electrode, substantially all of said bulkhead contacting said bottom surface of said piezo-electric element without damping vibrations thereof, which maintains a clearance between said bottom surface of said piezo-electric element and said bottom portion of said case, and prevents substantial flowing of any of said flowable conductive adhesive material away from said vicinity of said internal terminal means and said main electrode.

4,703,219

OPTICAL DEVICE FOR CONCENTRATING THE LIGHT RADIATION EMITTED BY A LIGHT EMITTING DIODE, AND A LIGHT EMITTING DIODE COMPRISING A DEVICE OF THIS NATURE

Guy Mesquida, Orsay, France, assignor to Thomson-CSF, Paris, France

Filed Nov. 1, 1984, Ser. No. 667,348
Claims priority, application France, Nov. 4, 1983, 83 17583
Int. Cl.[4] H01J 5/16; H01L 31/12
U.S. Cl. 313—111 **13 Claims**



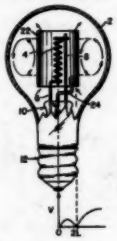
1. An optical device for concentrating the light radiation emitted by a light emitting diode, comprising at least one emissive section in the form of a strip provided in the active layer of the said diode, the said optical device having formed in a layer deposited on the surface of the diode in the path of the light rays and consisting of a material transparent to the wavelength of the radiation emitted by the diode, at least one planoconvex lenticular element associated with the emissive section of the active layer, this lenticular element having finite radius of curvature in a plane at right angles to the strip of emissive section, and an infinite radius of curvature in a plane tangent to the same strip of emissive section, said optical device further comprising a contact surface metallization formed on said layer.

4,703,220

INCANDESCENT LAMP WITH EXTENDED FILAMENT LIFETIME

Peter J. Walsh, Stirling, N.J., assignor to Duro-Test Corporation, North Bergen, N.J.

Filed May 26, 1982, Ser. No. 381,921
Int. Cl.[4] H01K 1/26, 1/32
U.S. Cl. 313—112 **20 Claims**



1. An incandescent lamp comprising:

an outer envelope;

an elongated incandescent filament within the outer envelope; and

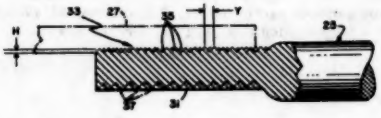
an elongated visible light transmissive second envelope separate and spaced from said outer envelope surrounding at least a substantial part of the length of said filament and having an internal surface spaced therefrom along its length by a distance greater than the thickness of the Langmuir layer of said filament when it is energized to incandesce and having an opening at each of its uppermost and lowermost vertical extremities to permit convection flow through said second envelope for reducing convection around the filament to a predetermined non-zero value at a location intermediate the filament and the inner surface of said second envelope and to substantially zero at said inner surface.

4,703,221

ELECTRIC LAMP AND METHOD OF MAKING

Carlos G. Ochoa, 7916 Bethany, El Paso, Tex. 79925; German C. Aguilar, Minerva #1321, Cd. Juarez, Chihuahua, Mexico, and Arnold E. Westlund, Jr., 405 Boone Ave., Winchester, Ky. 40391

Filed Apr. 18, 1986, Ser. No. 853,789
Int. Cl.[4] H01J 5/50, 61/06; H01K 1/50
U.S. Cl. 313—332 **9 Claims**



1. In an electric lamp including an envelope having a bulb portion and at least one press-sealed end portion, a filament structure located within said bulb portion and having at least one side rod support wire, a thin conductive foil hermetically sealed within said press-sealed end portion and electrically connected at one end thereof to an end portion of said side rod support wire, and at least one outer lead wire extending within said press-sealed end portion and electrically connected to said conductive foil, the improvement wherein said end portion of said side rod support wire is welded to said thin conductive foil and is of flattened configuration including a knurled surface having a plurality of spaced-apart, upstanding peaked projections of substantially uniform height located on said surface in a predetermined pattern, said foil being welded to said flat-

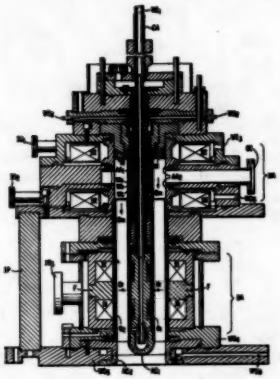
tened, knurled end portion of said side rod support wire along said knurled surface and without the use of welding flux.

4,703,222

HALL ACCELERATOR WITH PREIONIZATION DISCHARGE

Kiyoshi Yoshikawa, Kyoto; Hisayuki Toku, Uji; Makoto Ueda, Ohtsu, and Hiroshi Tamagaki, Kakogawa, all of Japan, assignors to Kyoto University, Kyoto, Japan

Filed Mar. 26, 1985, Ser. No. 716,368
Claims priority, application Japan, Aug. 31, 1984, 59-182463
Int. Cl.[4] H05H *1/00*; H01J *27/00*
U.S. Cl. 313—362.1 4 Claims



1. A Hall accelerator with preionization discharge, comprising a main discharge area having an anode means and a cathode means coupled to opposite ends thereof respectively; said anode means having inner and outer concentric cylindrical electrodes coaxial with said main discharge area, an anode terminal means adapted to apply a voltage across the concentric electrodes to generate an electric field therebetween, and an auxiliary electromagnet surrounding said concentric electrodes so as to generate a magnetic field in a longitudinal axial direction of the concentric electrodes, so that said anode means forms a magnetron type preionization discharge area in communication with said main discharge area; said anode means further having forced cooling means for cooling both said inner and outer cylindrical electrodes; said cathode means having an inner semispherical electrode aligned with said main discharge area, and an annular electrode surrounding said semispherical electrode with a spacing therefrom and extending away from said anode means more than said semispherical electrode; a gas inlet having an opening toward said preionization discharge area; and an electromagnet surrounding said main discharge area so as to generate a radial magnetic field therein, thereby gas from said preionization discharge area is ionized into Hall ions and accelerated in said main discharge area.

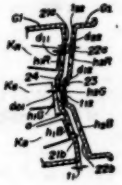
4,703,223

ELECTRON GUN FOR A COLOR DISPLAY APPARATUS

Yukinobu Iguchi; Kanemitsu Murakami, and Masahiro Kikuchi, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 27, 1985, Ser. No. 802,476
Claims priority, application Japan, Nov. 28, 1984, 59-250764
Int. Cl.[4] H01J *29/62, 29/50*
U.S. Cl. 313—414 3 Claims

1. An electron gun unit of the in-line type comprising first and second grids and a central cathode spaced from said first and second grids and which emits an electron beam so that the beam passes through a main electron lens substantially at right angles and is arranged with respect to said lens at the backside of a pair of side mounted cathodes which emit side electron beams so that the beams obliquely pass through said main electron lens, and wherein said first and second grids have central portions and side portions and are formed with depressions at the central portions thereof adjacent to said central cathode, characterized in that the plate thickness of the portion of said second grid in which said depression is formed is selected to be less than the thickness of said second grid at the



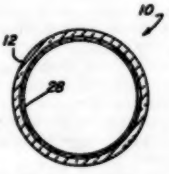
side portions of said second grid, the distance between the central cathode and the depression of said first grid is larger than the distance between the side cathodes and the side portions of said first grid, the distance between the second and first grids is selected to be larger at the portion adjacent the central cathode than the distance between the first and second grid at the portions adjacent said side cathodes, so that the optimum focusing voltage values for the respective beams and the voltage difference between the optimum focusing voltage for the respective beams is constant for the overall cathode current range.

4,703,224

FLUORESCENT LAMP SUBSTANTIALLY APPROXIMATING THE ULTRAVIOLET SPECTRUM OF NATURAL SUNLIGHT

Kendrick D. Rattray, Danvers, Mass., and Leo J. Plante, Seabrook, N.H., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jan. 7, 1985, Ser. No. 689,539
Int. Cl.[4] H01J *61/44*
U.S. Cl. 313—487 8 Claims



1. A suntanning fluorescent lamp comprising:

a glass envelope having a substantially circular configuration in cross-section and having axially opposed end portions, said envelope having an impurity level within a predetermined limit and being capable of transmitting UVA and UVB radiation;

first and second electrodes, each of said electrodes located within a respective one of said axially opposed end portions;

an ionizable medium enclosed within said envelope including an inert starting gas and a quantity of mercury which when energized generates a plasma discharge comprising ultraviolet radiation and a limited proportion of visible radiation; and

a phosphor means disposed on the interior surface of said envelope, said phosphor means being responsive to said ultraviolet radiation generated by said plasma discharge to provide a predetermined emission spectrum, and the combined emissions of said phosphor means and said visible radiation from said plasma discharge transmitted through said envelope having a spectral energy distribution of substantially UVA and UVB radiation as compared to visible radiation, said spectral energy distribution substantially approximating natural sunlight below about 400 nanometers, the intensity value of said spectral energy distribution at about 320 nanometers being within the range of from about 20% to 40% of the intensity value at about 400 nanometers.

4,703,225

PLASMA DISPLAY DEVICE

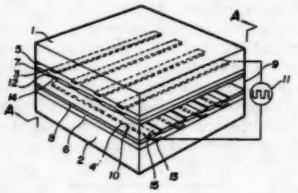
Sang H. Sohn, Kumi-si, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Dec. 13, 1985, Ser. No. 808,815

Claims priority, application Rep. of Korea, Dec. 13, 1984, 13135/1984[U]

Int. Cl.⁴ H01J *17/49, 61/067*

U.S. Cl. 313—587 **5 Claims**



1. A low voltage, high brightness plasma display device comprising in combination, sequentially:

upper and lower glass substrates,

a multiplicity of column electrodes formed on a lower surface of said upper glass substrate and a multiplicity of row electrodes formed on the upper surface of said lower glass substrate, said column and rows of electrodes being formed so as to be perpendicular one to the other while existing in planes parallel one to the other,

dielectric glass layers coated over said electrode bearing surfaces of said substrates,

magnesium-oxide protective layers formed respectively on each of said dielectric glass layers to define a gas cell disposed therebetween,

spacer member sandwiched between said structured upper and lower glass substrates creating a discharge gas cell chamber disposed therebetween,

metal strips deposited on said respective dielectric glass layers parallel to said column electrodes and row electrodes respectively, and

etched sections on said magnesium-oxide protective layers corresponding to each of said metal strips.

4,703,226

THYRATRON HAVING ANODE AND MULTIPLE GRIDS

Hugh Menown, Writtle, England, assignor to English Electric Valve Company Limited, Chelmsford, England

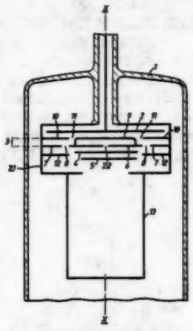
Filed Dec. 18, 1985, Ser. No. 810,302

Claims priority, application United Kingdom, Dec. 22, 1984, 8432613

Int. Cl.⁴ H01J *1/46, 15/02*

U.S. Cl. 313—595 **9 Claims**

1. A thyratron comprising: an anode, a control grid and an intermediate grid located between said anode and said control grid, the intermediate grid being arranged to partly enclose a volume of gas filling and to be at cathode potential during operation, the intermediate grid having a surface with an aperture through which the volume of gas filling communicates with the region outside the intermediate grid, the surface with



the aperture being disposed so that it does not directly face the anode, whereby, when the thyratron is in a conducting state, at least a substantial part of the current is derived from the said volume of gas filling.

4,703,227

LOW PRESSURE MERCURY VAPOR DISCHARGE LAMP AND PREPARATION THEREOF

Takao Takeda, Chigasaki; Hitoshi Yamazaki, Yokohama; Yoshiteru Taniguchi, Kamakura; Norihiko Tanaka, Kawasaki; Hiroshi Ito, Tokyo; Minoru Uchida, Yokosuka, and Jun Imai, Hiratsuka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

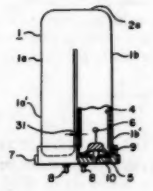
PCT No. PCT/JP84/00395, § 371 Date Apr. 12, 1985, § 102(e) Date Apr. 12, 1985, PCT Pub. No. WO85/00926, PCT Pub. Date Feb. 28, 1985

PCT Filed Aug. 2, 1984, Ser. No. 723,967

Claims priority, application Japan, Aug. 12, 1983, 58-147618; Aug. 12, 1983, 58-147619; Sep. 6, 1983, 58-163611; Feb. 15, 1984, 59-26486; Feb. 15, 1984, 59-26487; Feb. 15, 1984, 59-26646

Int. Cl.⁴ H01J *61/30*

U.S. Cl. 313—634 **28 Claims**

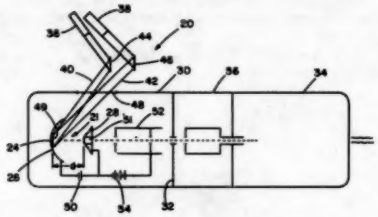


1. A low pressure mercury vapor discharge lamp for forming a U-shaped electric discharge path by a first U-shaped bulb placed on an end plate, charaterized in that both legs of said first U-shaped bulb are opposed to each other in a contacting state and including a second U-shaped bulb wherein one leg of said first bulb is connected to one leg of said second bulb to form a continuous two U-shaped electric discharge path.

4,703,228
APPARATUS AND METHOD FOR PROVIDING A MODULATED ELECTRON BEAM

William P. West, Poway, Calif., assignor to GA Technologies Inc., San Diego, Calif.

Filed Aug. 28, 1985, Ser. No. 770,386
Int. Cl.[4] H05B 37/02, 39/04, 41/36
U.S. Cl. 315—149 10 Claims



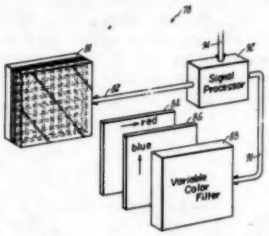
1. An electron gun for emitting a modulated high power electron beam comprising:
an evacuated envelope having an output end;
a photocathode disposed in said envelope for emitting electrons in response to the exposure to light;
an anode positioned between said photocathode and said output end for accelerating electrons emitted by said photocathode;
potential means interconnected between said anode and said photocathode for maintaining said anode electrostatically positive relative to said photocathode;
a first laser providing a first laser beam at a first frequency illuminating said photocathode, and
a second laser providing a second laser beam at a second frequency illuminating said photocathode at the same time, said first frequency differing from said second frequency by a beat frequency, whereby said photocathode provides said electron beam of electrons in which the electrons are spatially bunched in accordance with said beat frequency,
said anode being annular and having a central aperture for passing said electron beam, said anode including an electrically conductive mesh screen positioned over said aperture,
said beat frequency being between 50 MHz and 100 GHz, the spacing between said photocathode and said anode being between 0.5 cm and 2 cm, and said potential means providing a potential difference between said photocathode and said anode of between 50 kV and 100 kV.

4,703,229
OPTICAL DISPLAY FROM XEF EXCIMER FLUORESCENCE

William L. Nighan, Manchester, and Fred A. Otter, Jr., Columbia, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 10, 1985, Ser. No. 786,258
Int. Cl.[4] G09G 3/10
U.S. Cl. 315—169.4 11 Claims

1. A full color xenon fluoride excimer optical display, comprising:
enclosure means fabricated of fluorine compatible materials having an optically transmissive portion and having an interior cavity with opposing major surfaces;
gas mixture means contained within said cavity comprising xenon, fluorine and a rare gas;
electrode array means, responsive to synchronization signals, fabricated on at least one of said opposing major surfaces forming therebetween a plurality of discharge sites, said electrode array means providing a gas discharge at said discharge sites in response to said external signals such that xenon fluoride excimer molecules are formed in an excited state, emitting visible radiation upon decay therefrom comprised substantially of two primary colors; and
optical filter means for receiving said visible radiation responsive to said synchronization signals, said optical filter means dividing said visible radiation into each of said

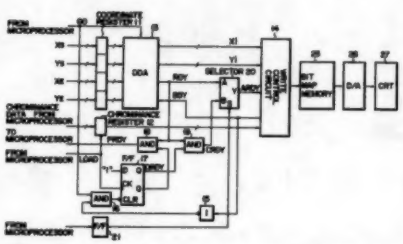


primary colors and subsequently providing selective recombination thereof in response to said synchronization signals; and
electronic synchronization means responsive to an external command signal for providing said synchronization signals.

4,703,230
RASTER OPERATION CIRCUIT

Nobuhiko Yamagami, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 26, 1986, Ser. No. 900,516
Claims priority, application Japan, Aug. 30, 1985, 60-191541; Aug. 30, 1985, 60-191542
Int. Cl.[4] H01J 29/70, 29/72
U.S. Cl. 315—364 6 Claims



1. A raster operation circuit in a graphic display apparatus, which is activated by a start signal from a microprocessor and comprises a digital differential analyzer for sequentially generating coordinates of a raster array approximating a line connecting a given starting point and an end point and a bit map memory for storing pixel data, comprising:
a register for loading chrominance data in response to a load signal from said microprocessor;
a write control circuit for writing the content of said register in a region of said bit map memory specified by coordinates generated from said digital differential analyzer in response to a first ready signal and generating a busy signal indicating that said write control circuit is busy;
a first flip-flop which is reset in response to the busy signal from said write control circuit and is set in accordance with the load signal;
a first gate for producing a third ready signal (PRDY) requesting to said microprocessor a chrominance data load operation with respect to said register in response to a

second ready signal (RDY) indicating completion of a coordinate setting operation from said digital differential analyzer when said first flip-flop is in a reset state;

a second gate for generating a fourth ready signal (CRDY) in response to the second ready signal when said first flip-flop is in a set state;

a second flip-flop for setting one of a line processing mode and a raster operation mode in response to a mode signal from said microprocessor; and

a selector for selecting one of said second and fourth ready signals in accordance with the logic state of said second flip-flop and supplying the selected ready signal as the first ready signal to said write control circuit.

4,703,231

FLAT TYPE IMAGE DISPLAY TUBE AND DISPLAY DEVICE USING THE SAME

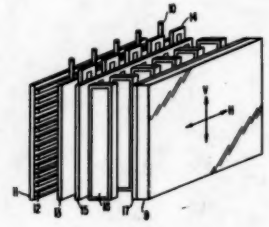
Kaoru Tomii, Isehara; Hiroshi Miyama, Yokohama; Yoshikazu Kawauchi, Kawasaki, and Jun Nishida, Shibuya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jun. 26, 1985, Ser. No. 748,833

Claims priority, application Japan, Jun. 26, 1984, 59-131329; Jul. 12, 1984, 59-144617; Oct. 29, 1984, 59-227136; Oct. 29, 1984, 59-227149; Mar. 6, 1985, 60-44057

Int. Cl.⁴ H01J *29/70*

U.S. Cl. 315—366 **12 Claims**



1. A flat display tube comprising:

a plurality of linear cathodes arranged equidistance in horizontal direction;

a plurality of strip electrodes elongated to the direction perpendicular to the linear cathodes arranged at rear of said linear cathodes with equal pitch,

an electrode arranged at front side of said linear cathodes for regulating the amount of electron beams which arrive on a phosphor screen,

a plurality of electrodes arranged at front side of said regulating electrode,

means for supplying a signal for shutting off the electron beams to one of said plurality of electrodes during horizontally blanking interval at beginning of horizontally scanning,

means for detecting beam current flowed into a front electrode of the electrode to which the shutting off signal is supplied, and

means for adjusting electron beam in such a manner that the detected current detected by said detecting means becomes predetermined value.

4,703,232

COMBINATION OF A MONOCHROME CATHODE-RAY TUBE AND A DEFLECTION UNIT HAVING A HIGH RESOLUTION

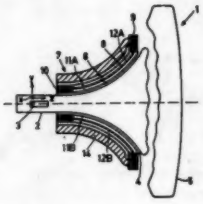
Joris A. M. Nieuwendijk; Werner A. L. Heijnemans; Albertus A. S. Sluijterman, and Nicolaas G. Vink, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 324,230, Nov. 23, 1981, abandoned. This application Jun. 6, 1986, Ser. No. 873,461

Claims priority, application Netherlands, Dec. 5, 1980, 8006628

Int. Cl.⁴ H01J *29/56*; H01H *1/00*

U.S. Cl. 315—370 **6 Claims**



1. A monochrome cathode ray display tube including a display screen, an electron gun assembly for producing an electron beam, and a deflection unit mounted on the tube such that its longitudinal axis substantially coincides with that of the electron gun assembly, said deflection unit comprising a line deflection coil system for deflecting the electron beam in a first direction, a field deflection coil system for deflecting the electron beam in a direction transverse to said first direction, and an annular core member of soft magnetic material surrounding at least the line deflection coil system, said deflection unit having a first end facing said display screen and a second end adjacent to said electron gun assembly, characterized in that said line and field deflection coil system are arranged for producing similarly-shaped dipole deflection fields, each of said fields including a six-pole component which, near said first end, is of positive polarity and of sufficient strength to minimize raster distortion, and which, near the center of the deflection field, is of a negative polarity and of a sufficient strength to minimize beam distortion with deflection of the beam, at least one of said fields having an effective length l satisfying the condition:

$$l \geqq (0.2\tau^2 + 0.25)L,$$

where L represents the distance between the deflection field center and the display screen, and where τ is the tangent of the deflection angle of the electron beam at maximum deflection.

4,703,233

TELEVISION RECEIVER HAVING SINGLE POLE DOUBLE THROW ROTARY SWITCH AND CENTERING CIRCUIT

Enrique Rodriguez-Cavazos, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 896,033, Aug. 13, 1986, abandoned. This application Jan. 9, 1987, Ser. No. 4,778

Int. Cl.⁴ H01H *21/68*; H01J *29/54*

U.S. Cl. 315—398 **14 Claims**

12. In a deflection system for generating a sawtooth-shaped deflection current in a yoke winding; said deflection system including a centering circuit coupled to said yoke winding for applying centering current having a DC component thereto; said centering circuit being provided with a single pole double throw (SPDT) rotary switch for determining the direction of

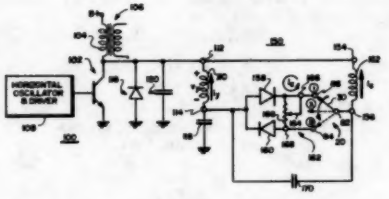
said DC component of said centering current through said yoke winding; said SPDT switch comprising:

a non-conductive terminal board having a central aperture;

first and second spaced-apart electrical terminals fixedly disposed on one side of said terminal board;

an electrically conductive washer-like wiper element;

a tubular rivet disposed in said central aperture for rotatably securing said washer-like wiper element to said one side of said terminal board for motion between a first end position and a second end position; said wiper element contacting said first terminal and said second terminal when occupying said first end position and said second end position



respectively; said wiper element being electrically disconected from either of said first and second terminals when occupying a midrange position between said end positions;

a common electrical terminal fixedly disposed on said terminal board and electrically coupled to said wiper element; and

an actuating member having a shaft portion disposed within said tubular rivet; said actuating member being disposed on said one side of said terminal board and mechanically coupled with said wiper element for selectively positioning said wiper element with respect to said first and second electrical terminals.

4,703,234

CHARGED-PARTICLE ACCELERATOR

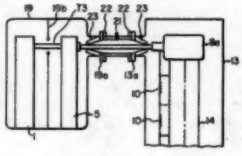
Shoji Kato, Tokyo, Japan, assignor to Jéol Ltd., Tokyo, Japan

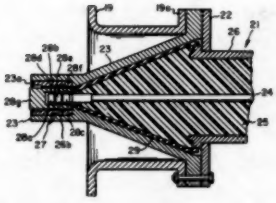
Filed Mar. 21, 1985, Ser. No. 714,613

Claims priority, application Japan, Mar. 30, 1984, 59-62672

Int. Cl.[4] H01J *25/10*

U.S. Cl. 315—5.41 **2 Claims**





1. A charged-particle accelerator comprising:

a first hermetically tight column arranged to be evacuated;

a charged-particle source including source electrode and electrodes for accelerating the charged-particles along an axis within the first column;

a second hermetically sealed column arranged to be filled with an insulating

a power supply circuit within said second column;

a third hermetically sealed column arranged to be filled with an insulating gas and sealably mounted adjacent the first column and supporting electrical conductors to the source electrode in the first column;

said second column having a conical receptacle, said second column defining a conical surface, said conical surface having an elastomer layer thereover;

said third column having a conical receptacle, said third column defining a conical surface, said conical surface having an elastomer layer thereover;

a detachable rod connector with conical surfaces at each end for being abuttingly received in the conical receptacles of the second and third columns wherein the connector comprises a tube through which electrical conductors pass, an outer sheath and electrically insulating resin between the tube and sheath; and

said rod connector having electrical conductors therein which plug into corresponding conductors in the first and second columns respectively.

4,703,235

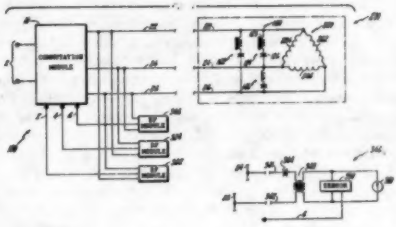
BRUSHLESS DC MOTOR

George R. Wisner, Deep River, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 3, 1986, Ser. No. 938,481

Int. Cl.[4] H02K *29/12*

U.S. Cl. 318—254 **7 Claims**



1. A brushless DC motor system comprising:

a DC motor having a rotor and at least two coil windings connected to corresponding coil winding terminals;

commutation means for supplying DC current to said coil winding terminals in response to applied position signals;

an eddy current sensing member attached to said rotor and has an azimuthal pattern of eddy current material having at least two predetermined values of eddy current sensitivity;

a rotor position detector comprises at least one radio frequency current generating means for generating radio frequency electric current at at least one predetermined sensing frequency and radio frequency voltage sensing means, connected to said current generating means, for generating said position signals representative of said rotor position, both of said current generating means and said radio frequency voltage sensing means being located remote from said motor, and said rotor position detector further comprises at least two eddy current probes, each is connected to a corresponding one of said at least two coil windings and being located in close proximity to said eddy current sensing member, said eddy current probe being connected to said current generating means and to said radio frequency voltage sensing means, so that said radio frequency voltage sensing means responds to a radio frequency voltage on said eddy current probe, having at least two probe voltage values dependent on which of said at

least two predetermined values of eddy current sensitivity of said eddy current sensing member is present in relation to said eddy current probe, whereby said position signals generated by said radio frequency voltage sensing means represents said rotor position;

said radio frequency current generating means also connected to a common electrical path between said commutation means and said coil winding terminals, whereby said DC current and said radio frequency current travel along a common conductor.

4,703,236

BRUSHLESS D.C. MOTOR

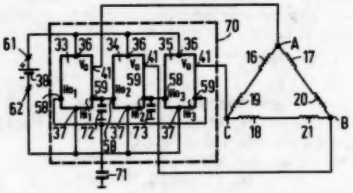
Johannes H. H. Janssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 7, 1986, Ser. No. 848,504

Claims priority, application Netherlands, Nov. 26, 1985, 8503249

Int. Cl.[4] H02P 6/02

U.S. Cl. 318—254 **10 Claims**



1. A brushless d.c. motor comprising a permanent-magnet rotor, a stator made of a magnetizable material on which a plurality of stator coils are arranged, said coils being connected between at least three terminals, and an electronic commutation device by means of which the terminals can be connected to and disconnected from one of two poles of a direct-voltage source in a cyclic switching pattern for energizing the stator coils, at least one of the poles of the direct-voltage source being disconnected from a terminal and being connected to another terminal during commutation intervals, and control means which, in order to reduce variations in motor torque as a result of transient effects in the energizing currents during commutation, cause the instants of disconnection and connection within a commutation interval to be shifted by a specific time interval relative to one another such that, the average values of said torque variations during the commutation intervals are substantially zero in comparison to the average value of the motor torque outside the commutation intervals.

4. A brushless d.c. motor comprising: permanent magnet rotor, a ferromagnetic stator having at least three stator coils connected to at least three terminals, a magnetically controlled electronic commutation device including a plurality of switching devices for cyclically connecting and disconnecting said three terminals to the positive and negative terminals of a source of d.c. voltage for supplying energizing currents to the stator coils in a cyclic pattern, said switching devices disconnecting at least one terminal of said d.c. voltage source from one of said three terminals and connecting it to another one of said three terminals during a commutation interval, and delay means coupled to the switching devices so that the switching devices cause the instants of disconnection and connection within a commutation interval to be shifted by a specific time interval relative to one another so as to reduce variations in motor torque during commutation intervals to an average value of zero in relation to the average value of the motor torque outside of said commutation intervals.

9. An electronic commutation device for a d.c. motor having a permanent magnet rotor and a ferromagnetic stator having at least three stator coils connected to three terminals, said device comprising: a plurality of switching devices for cyclically connecting and disconnecting said three terminals to the positive and negative terminals of a source of d.c. voltage for supplying energizing currents to the stator coils in a cyclic pattern, said switching devices disconnecting at least one terminal of the d.c. voltage source from one of said three terminals and connecting it to another one of said three terminals during a commutation interval, and delay means coupled to the switching devices so that, during said commutation interval, the switching devices open a connection from a terminal of the d.c. voltage source to one of the three terminals and close a connection from said terminal of the d.c. voltage source to another one of the three terminals with a time delay therebetween such that variations in motor torque during the commutation intervals will be reduced to an average value of zero in relation to the average value of the motor torque outside of said commutation intervals.

4,703,237

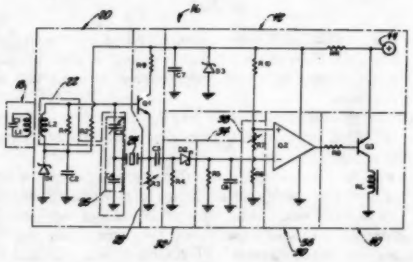
RAIN SENSOR

Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098

Filed Jun. 27, 1986, Ser. No. 879,265

Int. Cl.[4] B60S 1/08

U.S. Cl. 318—483 **34 Claims**



32. A window assembly for use with a control circuit for generating an electromagnetic field and for indicating the amount of coupling between a passive circuit and the control circuit to actuate a moisture removal means, said assembly comprising; a window upon which moisture accumulates for support in an automative vehicle, a passive circuit means supported by said window having an initial self-resonant frequency and being responsive to moisture for shifting the resonant frequency away from the initial self-resonant frequency whereby the control circuit will detect the amount of coupling.

4,703,238

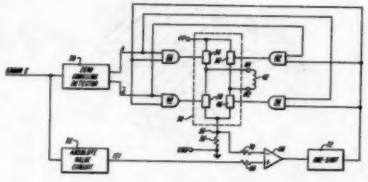
AMPLIFIER SYSTEM FOR D.C. MOTOR

Simyon Palmin, Sharon, and Brian Hewson, North Attleboro, both of Mass., assignors to Design Components, Incorporated, Franklin, Mass.

Filed Jan. 13, 1987, Ser. No. 2,797

Int. Cl.[4] G05B 9/02

U.S. Cl. 318—563 **7 Claims**



1. Apparatus for energizing a d.c. motor from a power source in response to an error signal comprising:

motor driver means including a first switching means for supplying a first current from the power source through said motor in one direction and a second switching means for supplying a second current from the power source through said motor in the opposite direction;

threshold detector means responsive to said error signal for comparing said error signal with a predetermined level representative of zero error and enabling the first switching means when said error signal is greater than said predetermined level and enabling the second switching means when said error signal is less than said predetermined level;

current sensing means for sensing said first and second currents through said motor and providing a motor current signal representative thereof;

absolute value circuit means responsive to said error signal for providing an absolute value signal representative of the absolute value of the difference between said error signal and said predetermined level; and

comparator means for comparing said motor current signal with said absolute value signal and providing an inhibit signal for inhibiting said first and second switching means when said motor current signal exceeds said absolute value signal, whereby the motor is deenergized when the motor current signal exceeds the error signal.

4,703,239

ARBITRARY-DIRECTION TRACER CONTROL UNIT

Etsuo Yamazaki, and Hitoshi Matsuura, both of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

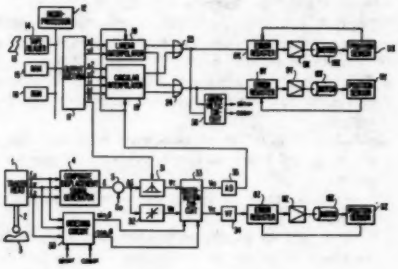
PCT No. PCT/JP86/00061, § 371 Date Sep. 19, 1986, § 102(e) Date Sep. 19, 1986, PCT Pub. No. WO86/04852, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 12, 1986, Ser. No. 923,141

Claims priority, application Japan, Feb. 26, 1985, 60-37197

Int. Cl.[4] G05B *19/36*

U.S. Cl. 318—578 **1 Claim**



1. An arbitrary-direction tracer control unit, characterized by the provision of:

profile arithmetic means for producing a velocity signal in a tracing feed direction in the X-Y plane and a velocity signal in the Z direction by performing profile arithmetic operations for tracing on the basis of X-, Y- and Z-direction displacement signals from a tracer head tracking the surface of a model, a direction signal indicating the tracing feed direction and a velocity command signal indicating a feed rate corresponding to numerical information;

Z-direction drive means for driving the model and the tracer head relative to each other in the Z direction in accordance with the Z-direction velocity signal produced by the profile arithmetic means;

command pulse signal generating means for producing a command pulse signal in the X direction and a command pulse signal in the Y direction on the basis of numerical information indicating the path of movement of the tracer head in the X-Y plane and the velocity signal in he tracing feed direction produced by the profile arithmetic means;

X- and Y-direction drive means for driving the model and the tracer head relative to each other in the X and Y directions in accordance with the X- and Y-direction command pulse signals created by the command pulse signal generating means; and

direction signal generating means for generating the direction signal indicating the tracing feed direction in the X-Y plane, on the basis of the X- and Y-direction command pulse signals created by the command pulse signal generating means, the direction signal being supplied to the profile arithmetic means.

4,703,240

SYSTEM FOR GUIDING A DRIVERLESS VEHICLE

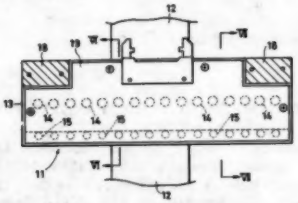
Yoshio Yoshimoto, Aichi; Minoru Kondoh, Kounan, and Yoshiyuki Terada, Inuyama, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Mar. 5, 1986, Ser. No. 836,309

Claims priority, application Japan, Mar. 7, 1985, 60-45829

Int. Cl.[4] G05D *1/00*

U.S. Cl. 318—587 **8 Claims**



1. A method for guiding a driverless vehicle along a guideline which is detected on a surface by an optical sensor having a plurality of light receiving elements, each of said elements being operable to detect the amount of light reflected from a different region of said surface and to generate a signal in response thereto, said method comprising the steps of:

measuring a plurality of values representing the amount of light received by each of said plurality light receiving elements,

comparing the measured value associated with each of said plurality of light receiving elements with a value representing the amount of light received by one or more neighboring light receiving elements,

selecting a smoothed value associated with each light receiving elements based upon the comparison of measured values,

assigning a weighted value associated with each light receiving element based upon the relative position of said light receiving element;

calculating the location of the guideline based on said smoothed value and said weighted value associated with each light receiving element,

whereby said vehicle is guided along said surface in accordance with the calculated location of the guideline.

4,703,241

MOTOR SERVO SYSTEM

Nobuhiro Suzuki, Mobara, Japan, assignor to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan

Filed Dec. 11, 1985, Ser. No. 807,742

Claims priority, application Japan, Dec. 20, 1984, 59-270028

Int. Cl.[4] G05B *11/28*

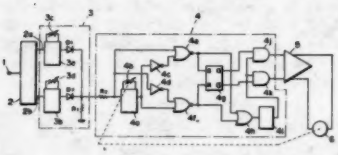
U.S. Cl. 318—599 **9 Claims**

1. A motor servo system for controlling a controlled element to a predetermined position comprising:

a discriminator having a plurality of output terminals, said discriminator generating a signal indicative of a controlled

direction and/or a controlled set point of said controlled element selectively at any one of said output terminals in response to an input signal indicative of the direction of desired movement of said controlled element;

a plurality of time signal generating sections connected to each output terminal of said discriminator to generate a pulse signal having a variable time width depending upon a target movement of said controlled element;



a servo circuit section including an error pulse generating section for comparing a pulse signal of a time signal generating section with a signal corresponding to the movement of said controlled element to generate an error pulse and a driving circuit section for generating a signal to drive said control element until the error pulse reaches a predetermined value; and

a motor rotated by the output signal of said servo circuit section to drive said control element.

4,703,242

CONTROL METHOD AND APPARATUS FOR POSITIONING SERVO SYSTEM

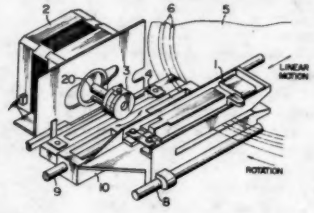
Kiyotake Kumazawa, Tokyo; Noriaki Minamide, Odawara; Yoshihiro Moribe, Chigasaki; Mikio Takahashi, Odawara; Osamu Beppu, Odawara, and Masahiro Mitamura, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 766,804, Aug. 19, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 9,072

Claims priority, application Japan, Sep. 29, 1984, 59-205316; Apr. 3, 1985, 60-68942

Int. Cl.[4] G05B *19/40*

U.S. Cl. 318—685 **20 Claims**



1. A positioning control method for use in a positioning system wherein a stepper motor having a drdive shaft and a plurality of quiescent positions provides an output torque for a driven member so that said driven member is moved to any one of stop positions corresponding to said stepper motor quiescent positions,

said stepper motor being controlled such that said driven member moves at a speed dependent upon a distance of movement of said driven member, said driven member exhibiting an oscillatory motion when it stops, said positioning control method comprising, when said driven member is to be moved from a first stop position to a second stop position:

a first step of rotating said drive shaft by an angular distance corresponding to a distanace between said first stop position and a third stop position which is located between said first and second stop positions and is adjacent to said second stop position;

a second step of maintaining said drive shaft at an angle corresonding to a quiescent position corresponding to said third stop position so that said driven member stops at said third position;

a third step of, after an oscillatory motion caused when said driven member is stopped at said third position is substantially completely settled, rotating said driven shaft by an angular distance corresponding to a distance between said third and second stop positions; and

a fourth step of holding said drive shaft at an angular position corresponding to said second position so that said driven member is positioned at said second stop position.

4,703,243

STEPPING MOTOR HARMONIC SUPPRESSION

David J. Ettelman, Hewlett, and John G. Floresta, Central Islip, both of N.Y., assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

Filed Apr. 17, 1986, Ser. No. 817,677

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **14 Claims**

1. A system for a microstepping control comprising:

digital means for providing multi-phase signals proportioned to provide a plurality of step values for motor positioning between 0 and 2 pi electrical degrees;

drive circuit means for providing a polyphase energizing current for the motor corresponding to said step values;

a stepping motor including

at least two phase windings connected to receive said energizing currents proportioned according to said step values,

a plurality of pole pieces associated with each of said windings and positioned to provide an air gap for the motor,

magnetic circuits for coupling said windings to said pole pieces,

a rotor in said air gap being positionable in accordance with said proportioned energizing currents applied to said windings; and

at least some of said plurality of pole pieces being non-symmetrically displaced to reduce multiple harmonics in the torque/displacement characteristics of the motor below predetermined levels.

4,703,244

PULSE MOTOR CONTROL APPARATUS

Kunihiko Takeuchi, Kawasaki, and Yuge Morishige, Funabashi, both of Japan, assignors to Tokyo Keiki Company Ltd., Tokyo, Japan

Filed Apr. 24, 1986, Ser. No. 855,363

Claims priority, application Japan, May 2, 1985, 60-93849

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **2 Claims**

1. A pulse motor control apparatus comprising:

speed setting means which outputs speed instruction data in response to a setting of a rotating speed of a pulse motor;

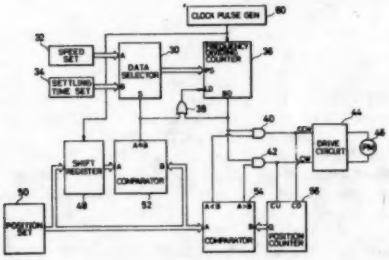
frequency dividing means for frequency dividing a clock

signal of a predetermined frequency by said speed instruction data of said speed setting means and outputting a frequency divided pulse;

position setting means which outputs rotor position instruction data in response to a setting of a desired rotor position of the pulse motor;

rotor position detecting means for detecting a present rotor position of the pulse motor;

control pulse switching means for comparing said rotor position instruction data from said position setting means with said present rotor position data from said position detecting means with respect to the number of steps of the rotor of the pulse motor for each of said data, outputting said frequency divided pulse of said frequency dividing means as a forward rotation control pulse to means for driving the pulse motor when the present rotor position data is smaller than the rotor position instruction data, and outputting the frequency divided pulse of said frequency dividing means as a reverse rotation control pulse to said pulse motor driving means when the present rotor position data is larger than the rotor position instruction data;



settling time setting means which outputs settling time data in response to a setting of a predetermined settling time at the end of which the rotation and vibration of the pulse motor are settled down and the pulse motor is stopped; and

selecting means for selecting and outputting the speed instruction data of said speed setting means to said frequency dividing means when the setting of the rotor position instruction data by said position setting means is not changed and for selecting and outputting the settling time data of said settling time setting means to said frequency dividing means when a change of the setting of the rotor position instruction data is detected,

wherein the change of the setting of said rotor position instruction data is detected and the settling time data is selected and outputted to the frequency dividing means by said selecting means, thereby inhibiting the output of the frequency divided pulse for a constant period of time in response to said settling time data, and stopping the pulse motor.

4,703,245

METHOD AND APPARATUS FOR CONTROLLING PERMANENT MAGNET SYNCHRONOUS MOTOR BY USING PULSE WIDTH MODULATION

Keiji Sakamoto, Hachiouji, and Toshio Kobayashi, Hino, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP85/00207, § 371 Date Dec. 12, 1985, § 102(e) Date Dec. 12, 1985, PCT Pub. No. WO85/04993, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 16, 1985, Ser. No. 811,840

Claims priority, application Japan, Apr. 16, 1984, 59-75970

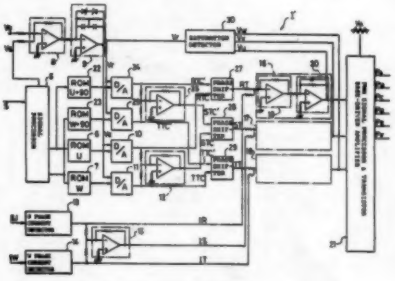
Int. Cl.⁴ H02P *5/40*

U.S. Cl. 318—809 **12 Claims**

1. A method of controlling a permanent magnet synchronous motor by using pulse width modulation, comprising the steps of:

(a) comparing a reference carrier wave with differences between detected armature currents and command signals for respective phase armature windings to obtain pulse width modulation signals;

(b) controlling an inverter with the pulse width modulation signals



(c) detecting a degree of saturation of voltage signals representing differences between the detected armature currents and the current command signals and determined by a peak value of the reference carrier wave; and

(d) shifting phases of respective phase current command signals from those which provide an orthogonal relation between a resultant armature current and a main flux of a magnetic field, in accordance with the detected degree of saturation.

4,703,246

CONTROL METHOD AND APPARATUS FOR SYNCHRONOUS MOTOR

Keiji Sakamoto, Hachioji, and Toshio Kobayashi, Hino, both of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP85/00388, § 371 Date Mar. 3, 1986, § 102(e) Date Mar. 3, 1986, PCT Pub. No. WO86/00766, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 10, 1985, Ser. No. 842,706

Claims priority, application Japan, Jul. 10, 1984, 59-141362

Int. Cl.⁴ H02P *5/40*

U.S. Cl. 318—809 **3 Claims**

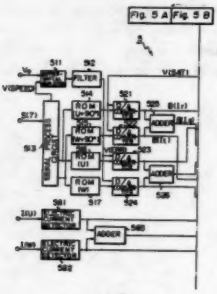
1. A control method for a synchronous motor using a magnetic field generated by permanent magnets, generating a pulse width modulation signal by comparing a difference between a current command signal representing a computed value of an armature winding current of the synchronous motor and a present value of armature winding current with a reference carrier wave, and controlling an inverter using said pulse width modulation signal; comprising the steps of:

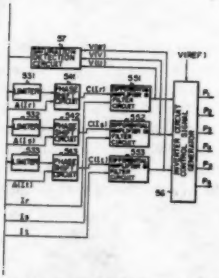
controlling the reactive component I_b of said armature winding current so that the multiplied product of K_2, L and I_b is limited to not exceed the value of K_1, where the reactive component of the armature winding current is I_b, the inductance of the armature winding is L, the counterelectromotive force constant is K_1, and the constant introduced from the pole number of said synchronous motor is K_2;

detecting the saturation degree of the differential signal between said current command signal defined by the peak value of said reference carrier wave and the armature winding current; and

changing the phase of said current command signal from a

phase perpendicular to that of the armature winding current and the field main magnetic flux to another phase in





response to said saturation degree to thereby control said reactive component I_b.

4,703,247

BATTERY APPARATUS FOR AN ELECTRIC SHAVER

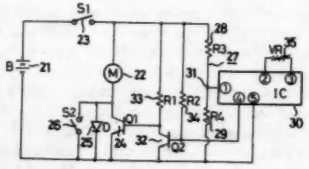
Toru Morioka, Hyogo, Japan, assignor to Sanyo Electric Co., Ltd., Japan

Filed Jul. 16, 1986, Ser. No. 886,181

Claims priority, application Japan, Jul. 19, 1985, 60-160710; Sep. 17, 1985, 60-204853

Int. Cl.[4] H02J 7/10

U.S. Cl. 320—13 **5 Claims**



1. Apparatus for supplying electric power from a battery having an arbitrary capacity to load, comprising:

first power supplying means for supplying to said load an amount of power corresponding to a main portion of the power capacity of said battery, whereby the power capacity is divided into said main poriton and a spare portion;

a supervisory control means for both (1) monitoring the level of power of said battery, and for (2) changing the level of power supplied to the load, when the main portion of the power of said battery is consumed;

a second power supplying means for supplying the spare portion of power from said battery to the load when the first power supplying means is rendered inoperable;

said supervisory control means including a detecting means for detecting the moment that the voltage of the battery has decreased to a predetermined level;

said supervisory control means further including reducing measn for reducing the supply of power to said load in response to said detecting means, when the voltage of the battery has discharged to the predetermined level;

said reducing means including a first switching means connected in series with the load, and a voltage dropping means connected in parallel with said first switching means; and

said second power supplying means including a second switching means operable for bypassing said voltage dropping means to directly supply power to said load from said battery.

4,703,248

SWITCHING ARRANGEMENT FOR FULL-WAVE POWER CONTROL WHICH IS INSENSITIVE TO MAINS VOLTAGE FLUCTUATIONS

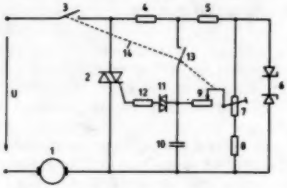
Gerhard Kühnemundt, Wurmlingen, and Heinz Elsässer, Rietheim-Weilheim, both of Fed. Rep. of Germany, assignors to Marguardt GmbH, Rietheim-Weilheim, Fed. Rep. of Germany

Filed Jul. 8, 1986, Ser. No. 883,509

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1985, 3524563

Int. Cl.[4] G05F 5/02

U.S. Cl. 323—300 **4 Claims**



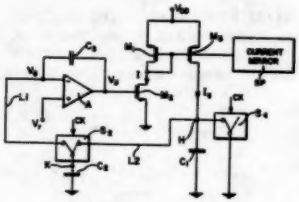
1. Switching arrangement for full wave power control of a load connected to an alternating voltage source, said arrangement comprising: a triac having a main current flow path for connection in series with the load and source, and a control electrode; first and second resistors connected together in series and two oppositely poled Zener diodes connected in series with said first and second resistors, said first and second resistors and said two Zener diodes forming a first series circuit which is connected in parallel with said main current flow path of said triac; a voltage divider composed of a variable resistor with a movable tap and a third resistor, said voltage divider being connected in parallel with said two Zener diodes; firing delay means composed of a potentiometer and a capacitor, said potentiometer being connected to said tap of said variable resistor and said capacitor being connected between said potentiometer and a point of connection between said Zener diodes and said triac; and a second series circuit composed of a diac and fourth resistor, said second series circuit having a first end connected to a point of connection between said capacitor and said potentiometer and a second end connected to said control electrode of said triac.

4,703,249

STABILIZED CURRENT GENERATOR WITH SINGLE POWER SUPPLY, PARTICULARLY FOR MOS INTEGRATED CIRCUITS

Alejandro De La Plaza, Bergamo, and Guido Torelli, S. Alessio, both of Italy, assignors to SGS Microelettronica S.p.A., Catania, Italy

Filed Jul. 28, 1986, Ser. No. 889,918
Claims priority, application Italy, Aug. 13, 1985, 21924 A/85
Int. Cl.⁴ G05F *3/26*
U.S. Cl. 323—316 **9 Claims**



1. A stabilized current generator comprising an operational amplifier with capacitive negative feedback whose output signal controls a current adjustment means for driving an input branch of a current mirror circuit, a current mirrored by said mirror circuit controlling a circuit feedback means for driving said operational amplifier so as to keep said mirrored current constant, wherein:

said circuit feedback means comprises a first capacitor and a first electronic switch in parallel, having one end at a fixed potential and having an opposite end fed by said mirrored current;

a second capacitor having one end at said fixed potential and having an opposite end connected to a second electronic switch adapted to connect said second capacitor to an inverting input of said operational amplifier in a first, inactive, position, and to a free end of said first capacitor in a second, active, position, said second electronic switch being controlled synchronously with said first electronic switch by a square-wave clock signal so that said first electronic switch is alternately open while said second electronic switch is in its active position and closed while said second electronic switch is in its inactive position;

and wherein a non-inverting input of said operational amplifier is connected to a fixed reference voltage source.

4,703,250

ELECTRIC SUPPLY

Gerard Frappe, Clamart, and Patrice Ortalli, Elancourt, both of France, assignors to Thomson-CSF, Paris, France

Filed Jun. 23, 1986, Ser. No. 877,353
Claims priority, application France, Jun. 25, 1985, 85 09652
Int. Cl.⁴ G05F *3/20*
U.S. Cl. 323—317 **4 Claims**

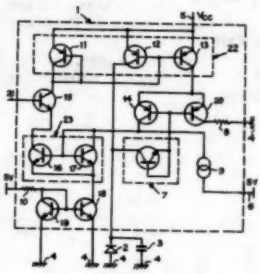
1. An electrical power supply for providing power to a rapid switching device comprising:

a current supply mens;

a switching initiation means;

a first current control means;

a second current control means responsive to said switch initiation means and said supply means wherein said second current means is connected to said first current means to form two current mirror circuit devices and wherein said current mirror circuit devices form an amplifying loop which, upon initiation of said current initiation means, provides a substantially instantaneous desired current to said rapid switching device and wherein the electrical consumption of said supply is minimized when said desired current is not supplied.

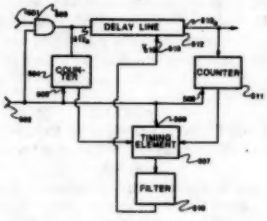


4,703,251

TESTING AND CALIBRATING OF AMPLITUDE INSENSITIVE DELAY LINES

Richard A. Baumgartner, Palo Alto; John N. Dukes, Los Altos Hills, both of Calif., and George A. Fisher, Andover, Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 628,069, Jul. 5, 1984, Pat. No. 4,638,191.
This application Sep. 2, 1986, Ser. No. 902,995
Int. Cl.⁴ G01R *27/28*; H03K *5/06*
U.S. Cl. 324—57 R **7 Claims**



1. An apparatus for calibrating a delay circuit, the delay circuit having a first input for receiving an input signal, an output on which a delayed signal is applied, the delayed signal being the input signal after the input signal has been delayed by the delay circuit, and a calibration input receiving a calibration signal, wherein the calibration signal is used to vary the length of delay of the signal from the first input to the output; the apparatus comprising:

a comparing means coupled to the first input of the delay circuit and the output of the delay circuit for comparing the phase of the input signal with the phase of the delay signal, the comparing means including

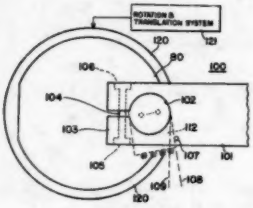
a first counter coupled to the first input of the delay circuit and having a first output signal,

a second counter coupled to the output of the delay circuit and having a second output signal, the second output signal having substantially the same frequency as the first output signal, and

a timing element means for aligning the first output signal with the second output signal; and,

a feedback means responsive to the comparing means for applying a calibration signal to the calibration input.

4,703,252
APPARATUS AND METHODS FOR RESISTIVITY TESTING
David S. Perloff, Sunnyvale, and Chester Mallory, Campbell, both of Calif., assignors to Prometrix Corporation, Santa Clara, Calif.
Filed Feb. 22, 1985, Ser. No. 704,296
Int. Cl.[4] G01R *1/073*
U.S. Cl. 324—62 **12 Claims**



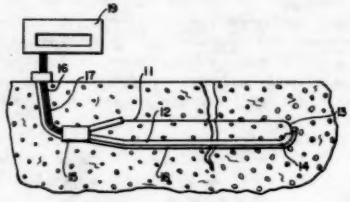
9. In a method of performing sheet resistance mapping measurements on a semiconductor wafer in a diameter scan mode, the steps of:

disposing a probe head assembly with a linear array of separated probe tips thereon adjacent a surface of said wafer with said linear array oriented at a prearranged small acute angle of orientation to a radius line of said wafer such that probe tip footprints made by contact with said wafer surface will be separated in a direction orthogonal to said radius line;

translating said probe head assembly relative to said wafer along said radius line to position said probe tips at a multiplicity of closely spaced test point locations while maintaining a constant acute angle of orientation of said probe tip array relative to said radius line; and

contacting said wafer surface with said probe tips at each test point location, thereby producing separate tracks of test probe footprints along said radius line.

4,703,253
PROBE FOR MONITORING THE CORROSION OF A STEEL REINFORCEMENT MEMBER IN A CONCRETE BODY
Roe Strommen, Rydningen 23B, Trondheim, Norway (N-7000)
Filed Sep. 4, 1985, Ser. No. 772,377
Int. Cl.[4] H01C *17/00, 13/00*
U.S. Cl. 324—65 CR **4 Claims**

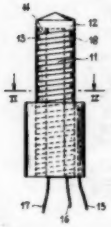


1. Probe for monitoring the corrosion of a steel reinforcement member embedded in concrete, said probe comprising an exposed metal element liable to corrode and arranged to be introduced in an electric circuit to measure the electric resistance of the element, the exposed probe element is a first part of a rodshaped member of a diameter and a material the same as the reinforcement member the corrosion of which is to be monitored, a second part of the rodshaped member being a reference element protected against corrosion by a suitable sealing means, said second part to be electrically connected in the electrical circuit as a temperature compensating element;

the ends of the first and second parts of the rodshaped member and the common area between these parts being connected by individual electric wires which connect the member to the resistance measuring circuit; and

the ends of the first and second parts of the rodshaped member and their wire connections are embedded in an insulating material which encapsulates the connections and supports the member while the concrete is setting.

4,703,254
PROBE FOR CORROSION TESTING
Roe Strommen, Rydningen 23B, N-7000, Trondheim, Norway
Filed Sep. 4, 1985, Ser. No. 772,378
Claims priority, application Norway, Mar. 6, 1985, 840831
Int. Cl.[4] H01C *17/00, 13/00*
U.S. Cl. 324—65 CR **5 Claims**



1. A probe for corrosion testing having a helically wound resistance element fabricated from a test material, said helically wound resistance element being formed around an electrically insulating core,

the probe improvement consisting of an elongated electrically conducting reinforcement member arranged within said insulating core, a first end of said resistance element nearest a first end of said reinforcement member is electrically connected to said reinforcement member,

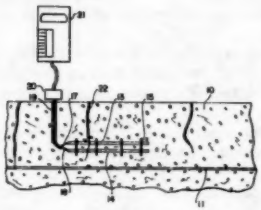
a portion of the helical resistance element wound on said electrically insulating core is sealingly covered by a housing member whereby the corrosive atmosphere cannot reach and attack the covered portion of said resistance element to provide a temperature compensating reference portion, the remaining portion of said helical resistance element being left exposed, and

electrical conductors are connected intermediate to the resistance element at the edge of said housing member and at the opposite end of the resistance element and the reinforcement member from their first ends so that the conductors can be connected to a measurement circuit whereby the resistance change of the exposed element portion with respect to the covered element portion will indicate the results of the corrosion test.

4,703,255
PROBE FOR CORROSION TESTING
Roe Strommen, Rydningen 23B, Trondheim, Norway (N-7000)
Filed Sep. 4, 1985, Ser. No. 772,379
Int. Cl.[4] G01N *27/26*
U.S. Cl. 324—65 CR **4 Claims**

1. Probe for corrosion testing in a concrete structure, comprising a pair of metallic elements of different materials, of which one is of a material similar to that of a reinforcement steel to be embedded in the concrete structure, characterized in that the metallic probe elements are of an elongated shape, the probe further comprising at least two holding means of an electrically nonconducting material, being provided to engage

with said elements at different locations along the probe to maintain them in a predetermined mutual distance during the



mounting in situ of the probe and the filling with concrete in a nonhardened state.

4,703,256

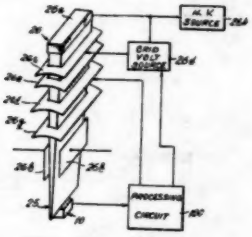
FARADAY CUPS

Yoshinori Hayafuji, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Division of Ser. No. 492,801, May 9, 1983, Pat. No. 4,608,493. This application Apr. 28, 1986, Ser. No. 856,471

Int. Cl.[4] G01R *29/00*

U.S. Cl. 324—71.3 **1 Claim**



1. In the method of measuring the energy density of an electron beam of generally strip-shaped cross section by Faraday cup means having an outer conductive layer; the improvement comprising the steps of causing said beam to effect a scan of said cup means in a direction transverse to the length of said strip-shaped cross section; grounding said outer conductive layer to prevent a build-up of electrons thereon; providing said cup means with an opening having a maximum dimension less than the width of said strip-shaped cross section location along said beam where the latter scans said cup means; and measuring current flow through said cup means as a function of said scan thereof by said beam.

4,703,257

LOGIC CIRCUIT HAVING A TEST DATA SCAN CIRCUIT

Takao Nishida, Kokubunji; Toru Hiyama, Atsugi; Kaoru Moriwaki; Shun Ishiyama, both of Hadano, and Shunsuke Miyamoto, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,296

Claims priority, application Japan, Dec. 24, 1984, 59-270877

Int. Cl.[4] G01R *31/28*

U.S. Cl. 324—73 R **4 Claims**

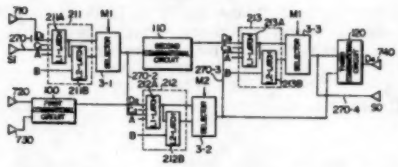
1. A logic current having a diagnostic function, comprising:

a plurality of combinational circuits;

a plurality of first latch circuits each connected to an output terminal of one of said combinational circuits for taking in output data of said one combinational circuit in response to an applied one of a plurality of system clock signals and for taking in test data applied to each first latch circuit in response to an applied first scan clock signal;

a plurality of second latch circuits each connected to an output terminal of a corresponding one of said first latch circuits and responsive to an applied second scan clock signal for taking in output data of the corresponding first latch circuit; and

a plurality of selectors each having an output terminal connected to an input terminal of a corresponding one of said combinational circuits, and having two input terminals respectively connected to the output terminal of one of said first latch circuits and to an output terminal of one of said second latch circuits connected to said one first latch circuit and reponsive to an applied at least one mode control signal for selectively outputting an output signal of the one first latch circuit or an output signal of the one second latch circuit, respectively.



4,703,258

METHOD OF TESTING CONTROL DEVICES

Reinhard Palesch, Vaihingen/Enz, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

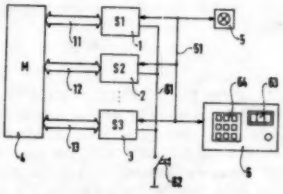
PCT No. PCT/DE85/00267, § 371 Date Feb. 21, 1986, § 102(e) Date Feb. 21, 1986, PCT Pub. No. WO86/01620, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 8, 1985, Ser. No. 852,805

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1984, 3432430

Int. Cl.[4] G01R *31/00*

U.S. Cl. 324—73 R **7 Claims**



1. Method of testing via a single test line a plurality of controller devices in a motor vehicle, which perform functions in dependency on sensor signals and, in the event of a function error, store an error data word and upon interrogation convert the stored data word into an error signal or a sequence of signals, comprising the steps of:

assigning to each controller device a different priority corresponding to a length of a priority pulse generated by the controller device;

applying to the test line an excitation signal which sets the test line to a logic level corresponding to the priority pulses;

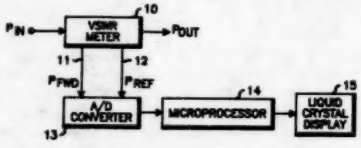
simultaneously applying the priority pulses of all controller devices to the test line and, at a time point of expiration of the longest priority pulse, interrogating for a predetermined time interval the stored error data word in the corresponding controller device and transmitting the error signal to an indicator, then applying the priority pulses of the remaining controller devices to the test line

and at a time point of expiration of the next longest priority pulse, repeating the application and interrogation steps for the remaining controller devices until error signals from all controller devices are transmitted to the indicator.

4,703,259
FORWARD AND REFLECTED POWER MEASUREMENT AND DISPLAY

Shlomo Berliner, Tikva; Areyh Vered, Tev Aviv; Reich Shmuel, Reshon Lezion, and Moshe Vaige, Natanya, all of Israel, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 17, 1985, Ser. No. 774,275
Int. Cl.[4] G01R *19/10*
U.S. Cl. 324—95 **17 Claims**



1. A measurement and display device for simultaneously dsplaying two parameters, comprising:

means for receiving a first and second parameter to be simultaneously displayed;

sampling means, coupled to said receiving means, for sampling said parameters, to provide a first and second new sample value;

means for displaying a first and second current sample value of said first and second parameters;

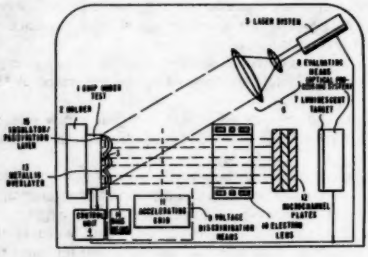
first comparing means, coupled to said sampling means and said displaying means, for respectively comparing said first and second new sample values and said first and second current sample value, and for providing a first and second comparision signal;

second comparing means, coupled to said first comparing means, for respectively comparing said first and second comparison signal with a first and second predetermined threshold, and for limiting changes in said first and second current sample value to a predetermined maximum change.

4,703,260
FULL CHIP INTEGRATED CIRCUIT TESTER

Johannes G. Beha, Wadenswil, Switzerland; Russell W. Dreyfus, Mt. Kisco, N.Y.; Jeffrey A. Kash, Pleasantville, N.Y., and Gary W. Rubloff, Katonah, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 23, 1985, Ser. No. 778,823
Int. Cl.[4] G01R *31/28*
U.S. Cl. 324—158 R **11 Claims**



1. A system for contactless probing of an integrated circuit chip (1) having test points (3) of interest for testing, characterized by:

(a) contact means (4) for introducing dynamic operational signals to the chip (1), so as to cause instantaneous operational voltages at selected test points (3) as a function of operation;

(b) activation means (5–6) for flooding the chip surface with pulsed ultraviolet laser light, causing photoelectron emission as a function of the voltages at test points (3) on the chip (1);

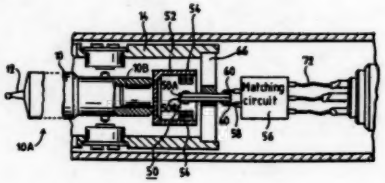
(c) luminescent target means (7), for converting to luminescence values the photoelectron emission from test points (3); and

(d) voltage discrimination means (9) associated with the electron path between the chip (1) and said luminescent target means (7), for modifying photoelectron patterns to represent test point voltages.

4,703,261
DIFFERENTIAL HALL-EFFECT GEAR MEASURE FEELER

Nikolaus Berchtold, Zürich, Switzerland, assignor to Maag Gear-Wheel and Machine Company Limited, Zürich, Switzerland

Filed Dec. 11, 1984, Ser. No. 680,363
Claims priority, application Switzerland, Dec. 15, 1983, 6686/83
Int. Cl.[4] G01B *7/14*; H03K *17/90, 19/18*
U.S. Cl. 324—207 **6 Claims**



1. A gear measuring feeler comprising:

a housing;

a feeler rod pivotably mounted in said housing and deflectable from a predetermined position;

said feeler rod having a first end and a second end;

a feeler probe provided at said first end of said feeler rod;

a measuring system comprising two members which are movable relative to each other;

one of said two members being supported at said second end of said feeler rod;

said two members comprising means for generating a static magnetic field and a Hall-effect sensor;

said Hall-effect sensor containing two Hall-effect sensor elements and having a differential output;

said measuring system generating electrical signals proportional to the deflection of said feeler rod from said predetermined position thereof;

a matching circuit operatively connected to said measuring system to receive and standardize said electrical signals and having an input side and an output side; and

said matching circuit having said input side connected with said differential output of said Hall-effect sensor and containing a differential amplifier circuit which is mounted at said housing and which receives the sum of the absolute values of the output voltages generated by said two Hall-effect sensor elements and delivers at said output side a corrected signal.

4,703,262

MOUNTING STRUCTURE FOR SPINDLE ORIENTATION MAGNETIC SENSOR SYSTEM

Yoshiki Fujioka, Tokyo, and Hiroshi Tokuoka, Hino, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

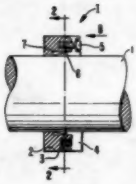
PCT No. PCT/JP85/00236, § 371 Date Dec. 13, 1985, § 102(e) Date Dec. 13, 1985, PCT Pub. No. WO85/04953, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 26, 1985, Ser. No. 821,552

Claims priority, application Japan, Apr. 26, 1984, 59-084633

Int. Cl.[4] G01P *3/487;* G01B *7/30;* B23Q *5/20;* F16B *2/00*

U.S. Cl. 324—208 20 Claims



1. A magnetic sensor system for spindle orientation in which a magnetic body is attached to a rotating spindle and a magnetic signal from the magnetic body is detected by a sensing unit arranged on a mechanically stationary member to detect the rotational position of the spindle, comprising:

a pair of wedge-shaped, annular fastening elements fitted onto the circumferential surface of said spindle in such a manner that tapered portions of said wedge-shaped annular fastening elements oppose each other;

an accommodating ring having a first cut-out portion on an inner circumferential side thereof adjacent the spindle for receiving said wedge-shaped, annular fastening elements, and having a second cut-out portion on an outer circumferential side thereof, said accommodating ring having an accommodating portion for accommodating the magnetic body; and

an annular cover body having a first projection which projects at a position corresponding to said first cut-out portion of said accommodating ring, for sliding said wedge-shaped, annular fastening elements axially along the circumferential surface of the spindle, and having a second projection for being fitted into said second cut-out portion of said accommodating ring;

the magnetic body being attached to the spindle by fixedly securing said accommodating ring and said cover body together on the spindle.

4,703,263

METHOD FOR NON-DESTRUCTIVE TESTING OF A MAGNETIZABLE WORKPIECE UNDER COLD WEATHER CONDITIONS USING A MAGNETIC PARTICLE BATH

Phillip W. Schiffert, Oak Park, Ill., assignor to Magnaflux Corporation, Chicago, Ill.

Filed Aug. 1, 1985, Ser. No. 761,357

Int. Cl.[4] G01N *27/84;* G01R *33/12;* G01M *27/82;* H01F *1/28*

U.S. Cl. 324—216 31 Claims

14. A magnetic particle bath suitable for non-destructive testing of a magnetizable workpiece under cold-weather conditions, which comprises water, magnetic particles, modified dextrose as an adhesive component, a wetting agent, and an anti-freeze component consisting essentially of urea and ethylene glycol, glycerine or monoethanolamine.

4,703,264

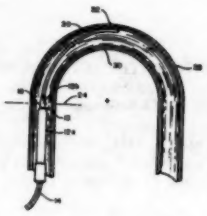
SELF-ORIENTING CONDUIT PROBE

Lawrence J. Edwards, Suffield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 13, 1985, Ser. No. 732,999

Int. Cl.[4] G01N *27/87;* G01R *33/00*

U.S. Cl. 324—220 4 Claims



1. A self-orienting probe for traversing the interior of a curved conduit, comprising:

a carrier, including at least a portion rotatable within the conduit about an axis substantially colinear with the longitudinal axis of the conduit;

means for driving the carrier longitudinally through the conduit;

an elongated, flat, resilient alignment strip, secured at one end thereof to the rotatable portion of the carrier and extending longitudinally through the interior of the conduit, the strip further having two substantially different bending moments about a first transverse axis and a second transverse axis perpendicular thereto, the strip being more easily deformable about the second axis than about the first axis.

4,703,265

METHOD AND APPARATUS FOR COMPENSATING FOR DIFFERENT DEPTHS OF SUN CURRENTS INDUCED IN THE OBJECT TESTED FOR IMPERFECTIONS

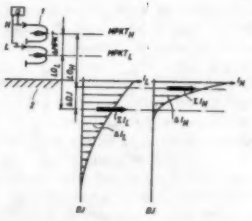
Bengt H. Törnblom, Västerås, Sweden, assignor to Törnbloms Kvalitetskontroll AB, Sweden

Filed Feb. 15, 1985, Ser. No. 702,314

Claims priority, application Sweden, Feb. 17, 1984, 8400861

Int. Cl.[4] G01N *27/90;* G01R *33/12*

U.S. Cl. 324—232 15 Claims



5. A device for testing an electrically conductive object for the presence of imperfections therein, comprising:

at least one transducer adapted to be moved over the surface of said object at a given distance from the surface thereof:

said at least one transducer being adapted to be excited with electrical signals having at least two different frequencies to induce corresponding different electrical eddy currents at different depths in the object and separated by a distance ΔDJ and the at least one transducer having a different effective midpoint for each of said at least two differ-

ent frequencies with a separation between the effective mid-point of ΔMPKT;

said at least one transducer sensing said different electrical eddy currents and providing output signals representative thereof; and means for altering the excitation of said at least one transducer such that ΔDJ substantially equals ΔMPKT to compensate for the difference in depth of penetration of said electrical eddy currents induced in said object.

4,703,266

GRADIENT METER WITH THIN MAGNETIC LAYER

Guy Chiron, Gieres, and André Dumont, St. Egreve, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 2, 1981, Ser. No. 240,472

Claims priority, application France, Mar. 17, 1980, 80 05907

Int. Cl.⁴ G01R *33/02*

U.S. Cl. 324—249 **2 Claims**

1. Gradient meter to measure the spatial derivatives

$$\delta Hi/\delta j \ (i=x, y, z; j=x, y, z)$$

of a magnetic field H utilizing magnetic sonds with a thin layer of the type which comprises:

a magnetic layer of cylindrical form of revolution, the magnetic layer having an axis of difficult magnetization parallel to the axis of the cylinder and an axis of easy magnetization that is circular in a plane of the layer in a right section of the cylinder, said layer being initially saturated along its axis of easy magnetization,

an excitation winding with an axis parallel to the axis of the cylinder to create, along the direction of the difficult magnetization axis, an alternating excitation field having frequency f,

a winding with an axis parallel to the easy magnetization axis to sample an alternating signal at one of the frequencies f or 3f produced by the excitation,

a counterreaction winding with a geometric axis in which is injected a continuous counterreaction current derived from the alternating signal after amplification, detection and integration, and of intensity such that the current substantially annuls a component of the magnetic field that is parallel to the axis of difficult magnetization of the thin layer, characterized in that, to measure a component

$$\delta Hi/\delta j$$

of the gradient of field H, the gradient meter comprises first and second such magnetic sonds having the geometic axes of their counterreaction windings aligned along the direction of an axis i, said sonds being spaced from each other along an axis j, the counterreaction windings being connected together such that the counterreaction current of the first sond is injected in the second sond, and such that the counterreaction current of the second sond represents the value

$$\delta Hi/\delta j$$

to be measured.

4,703,267

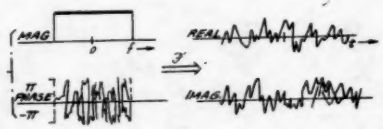
HIGH DYNAMIC RANGE IN NMR DATA ACQUISITION

Andrew A. Maudsley, New York, N.Y., assignor to Advanced NMR Systems, Inc., Woburn, Mass.

Filed Jul. 17, 1985, Ser. No. 756,066

Int. Cl.⁴ G01R *33/20*

U.S. Cl. 324—307 **28 Claims**



1. A method of receiving NMR signals comprising:

exciting the nuclei of at least some of the atoms of an object during a first time interval to produce an NMR during a second time interval following the first time interval;

varying the phase of the nuclei of at least some of the atoms of the object to reduce the ratio of the peak amplitude of the received NMR signal to its average power; and

receiving at least part of the NMR signal during the second time interval.

4,703,268

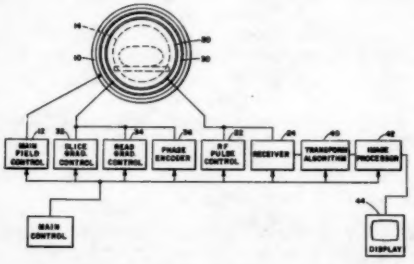
CLEAN MULTIPLE ECHO MAGNETIC RESONANCE IMAGING USING ASYMMETRIC SEQUENCES

Michael L. Gyngell, Berkhamsted, and Graham L. Nayler, Abingdon, both of United Kingdom, assignors to Picker International, Ltd., Highland Hts., Ohio

Filed Mar. 3, 1986, Ser. No. 835,467

Int. Cl.⁴ G01R *33/20*

U.S. Cl. 324—309 **21 Claims**



21. A magnetic resonance imaging apparatus comprising:

a magnet for generating a magnetic field generally longitudinally through an image region;

a radio frequency pulse applying means for applying radio frequency pulse sequences, each sequence including a radio frequence excitation pulse followed by at least two refocusing pulses;

a read gradient applying means for applying read gradients in the image region, the read gradients including:

a first read gradient which is applied between the excitation and first refocusing pulses;

a second read gradient which is applied after the first

refocusing pulse and having a preselected amplitude during the occurence of a first spin echo, the first spin echo occurs when the amplitude of the second read gradient integrated with respect to time equals the amplitude of the first gradient integrated over its duration;

applying a third read gradient which is continuous with the second read gradient, commencing at the first spin echo, the second and third read gradients having a preselected amplitude during the first spin echo;

after the second refocusing pulse, applying a fourth read gradient pulse;

a second spin echo occurs when the amplitude of the fourth read gradient integrated with respect to time equals the amplitude of the third read gradient integrated over its duration;

the fourth read gradient and a fifth read gradient continuous therewith have said preselected amplitude during the second spin echo;

parasitic echoes occur when the amplitude of the fourth read gradient integrated with respect to time equals one of:

(i) the amplitude of the first read gradient integrated over its duration,

(ii) the sum of the amplitudes of the second and third read gradients over their durations,

(iii) the sum of the amplitudes of the first, second, and third read gradients integrated over their durations;

the amplitudes of the durations of the first, second, third, and fourth read gradients being selected such that:

(i) the amplitude of the first read gradient integrated over its duration,

(ii) the sum of the amplitudes of the second and third read gradients over their durations, and

(iii) the sum of the amplitudes of the first, second, and third read gradients integrated over their durations

are each different from the amplitude of the third read gradient integrated over its duration such that the second spin echo is offset in time from the parasitic echoes;

data acquisition means for acquiring magnetic resonance data during each spin echo; and,

image reconstructing means for reconstructing an image representation from the acquired data.

4,703,269

NUCLEAR MAGNETIC RESONANCE IMAGING METHODS AND APPARATUS

Ian R. Young, Sunbury-on-Thames, England, assignor to Picker International Ltd., Wembley, England

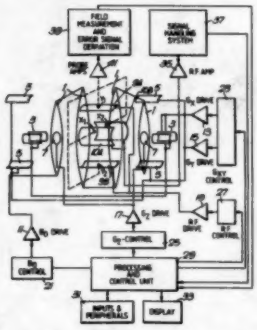
Filed Aug. 12, 1986, Ser. No. 895,895

Claims priority, application United Kingdom, Sep. 2, 1985, 8521791

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **6 Claims**

4. A nuclear magnetic resonance imaging apparatus comprising: means arranged to apply a steady magnetic field to a body; means arranged to apply in turn first, second and third radio frequency (RF) pulses to said body; means arranged to apply a gradient field to said body during each said RF pulse in a direction normal to the plane of a selected slice of said body, thereby to cause said RF pulses to excite spins preferentially in said slice; means arranged to apply before said third RF pulse at least one gradient field in said direction to correct dephasing of spins due to said gradient fields applied during said RF pulses; means for detecting spin echoes of the spins excited in



said slice; and means for utilising the resulting data to produce an image of said slice.

4,703,270

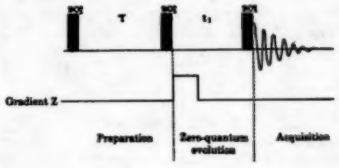
ZERO QUANTUM NMR IMAGING AND SPECTROSCOPY IN A LOW HOMOGENEITY MAGNETIC FIELD

Laurance D. Hall, Cambridge, England, and Timothy J. Norwood, Vancouver, Canada, assignors to The University of British Columbia, Vancouver, Canada

Filed Apr. 18, 1986, Ser. No. 853,447

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **8 Claims**



1. A method of obtaining zero-quantum coherence resolved images and spectra from a spin system substance in an inhomogeneous or low homogeneity magnetic field which comprises applying to the substance a pulse and spatial encoding sequence.

4,703,271

NMR TOMOGRAPHIC APPARATUS

Wilfried Loeffler, Herzogenaurach, and Arnulf Oppelt, Buckenhof, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 31, 1984, Ser. No. 666,656

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1983, 3340523

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **7 Claims**

1. An NMR tomography apparatus for representing by spin-echo techniques images of selected cuboid segments of an examination region occuped by an examination subject, said apparatus comprising:

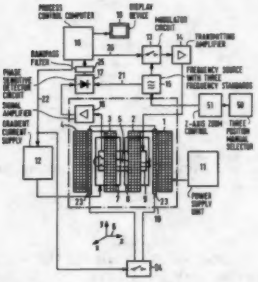
means for generating a basic magnetic field in said region;

means for generating three gradient magnetic fields in three respective directions which are orthogonal in said regions;

means for generating high frequency pulses for deflecting atomic nuclei in said selected segment from an equilibrium

position in the presence of said basic and gradient magnetic fields;

means for controlling said means for generating said gradient fields and said means for generating said high frequency pulses, said means for controlling causing said means for generating high frequency pulses to generate a 90° pulse and a 180° pulse, and said means for controlling also causing said means for generating said gradient fields to generate a gradient field in a first direction during said 90° pulse for spatially limiting the volume of said region wherein said atomic nuclei are energized to precession



and signal emission, and causing said means for generating gradient fields to generate a gradient field in a second direction, perpendicular to said first direction, during said 180° pulse for spatially limiting a partial volume of said region in said second direction in which said atomic nuclei are energized to precession and signal emission; and

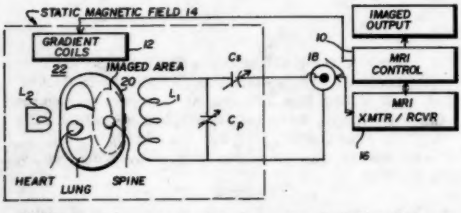
means for detecting the resonant frequency of said atomic nuclei in a third direction perpendicular to each of said first and second directions during return of said nuclei to said equilibrium position upon removal of said high frequency pulses.

4,703,272

APPARATUS AND METHOD FOR DECOUPLING MRI RF COIL FROM SELECTED BODY PORTIONS USING PASSIVE COMPONENTS

Mitsuaki Arakawa, Hillsborough, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 29, 1986, Ser. No. 901,596
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—311 **8 Claims**



1. A magnetic resonance imaging system including RF transmitter and receiver circuits coupled to RF coil circuits located within a static magnetic field having means for producing changing magnetic gradients, said RF coil circuits comprising:

at least one active RF coil structure connected via transmission line to said RF transmitter and receiver circuits and located about at least a portion of a volume to be imaged and providing MRI RF responses; and

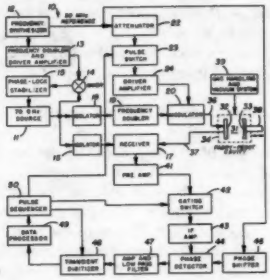
at least one passive conductive RF decoupling structure also disposed about a portion of said volume but at a location which is proximate a sub-volume thereof from which MRI RF responses are to be suppressed.

4,703,273

140 GHZ PULSED FOURIER TRANSFORM MICROWAVE SPECTROMETER

William F. Kolbe, Oakland, and Branko Leskovar, Moraga, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 29, 1985, Ser. No. 759,783
Int. Cl.[4] G01N *27/78*
U.S. Cl. 324—314 **14 Claims**



1. A method of pulsing a high frequency responsive device with high frequency energy comprising:

(a) generating a continuous high frequency carrier signal,

(b) periodically modulating said high frequency carrier with a low frequency modulating signal to produce a modulated sideband signal above or below the frequency of said carrier signal,

(c) tuning said high frequency responsive device to the frequency of said sideband signal and away from the frequency of said carrier signal.

4,703,274

ARRANGEMENT OF RF COILS AND RELATED METHOD FOR MAGNETIC RESONANCE IMAGING OF A SELECTED INNER-VOLUME

Leon Kaufman; Joseph W. Carlson, both of San Francisco; Mitsuaki Arakawa, Hillsborough; Barry M. McCarten, Piedmont, and John H. Fehn, El Sobrante, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 29, 1986, Ser. No. 901,594
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—318 **21 Claims**

1. An arrangement of RF coils for MRI of a selected inner-volume of an object, said coil arrangement comprising:

a first RF coil disposed in a first predetermined position to one side of a space into which an object may be located;

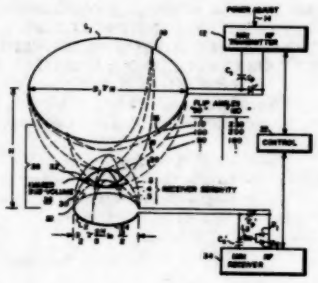
a second RF coil disposed in a second predetermined position said at another side of said space;

first RF signal coupling means connected to pass first RF signals into and/or out of said first coil; and

second RF signal coupling means connected of independently pass second RF signals into and/out of said second coil,

said first and second coils having three-dimensional RF field

coupling patterns which overlap within said space to define a limited inner-volume within which MRI imaging



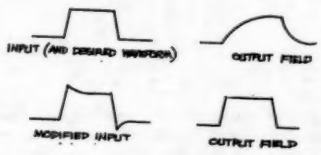
may be achieved without imaging an entire cross-section of said object.

4,703,275

METHOD AND APPARATUS TO COMPENSATE FOR EDDY CURRENTS IN MAGNETIC RESONANCE IMAGING

G. Neil Holland, Chagrin Falls, Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Filed Jul. 25, 1985, Ser. No. 758,761
Int. Cl.[4] G01K *33/20*
U.S. Cl. 324—318 5 Claims



1. A method of magnetic resonance imaging a region of interest of a subject in an imaging region, the method comprising:

before positioning the subject in the image region, calibrating gradient magnetic fields by:

positioning a magnetic field sensing coil means in the image region;

energizing a field producing means with a gradient energization profile to create a resultant gradient field which differs from a preselected gradient field by errors attributable at least in part to eddy current fields caused by energizing the field producing means;

with the sensing coil means, sensing the resultant gradient field including the eddy current fields caused by energizing the field producing means;

providing an initial correction signal;

combining the energization profile with the correction signal;

comparing the sensed resultant gradient field with the combined energization profile and correction signal;

adjusting the correction signal to optimize a preselected relationship between the sensed resultant gradient field and the combined energization profile and correction signal;

positioning the region of interest of the subject in the image region;

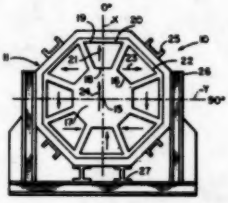
energizing the field producing means with the preselected gradient energization profile combined with the adjusted correction signal to produce a corrected resultant gradient field, whereby the region of interest is imaged utilizing gradient fields which optimally approximate the preselected gradient field.

4,703,276

PERMANENT MAGNET RING ASSEMBLY FOR NMR IMAGING SYSTEM AND METHOD FOR USING SUCH ASSEMBLY

Steve Beer, Burlington, Mass., assignor to Elscint Ltd., Haifa, Israel

Filed Apr. 24, 1985, Ser. No. 726,611
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—319 10 Claims



1. In an NMR imaging system, apparatus for producing a homogeneous transverse magnetic field in a predetermined volume comprising:

(a) a ring assembly having an axial extent L defined by a plurality of non-magnetic rings, each having an axis and positioned side-by-side so that axis of the rings are colinear and define the axis of the ring assembly;

(b) a plurality of discrete, permanent magnet segments angularly mounted within each ring for defining a central, coaxial aperture;

(c) each segment in said each ring having the same angular position and the same easy axis of magnetization whose orientation is functionally related to the angular position of the segment in the ring;

(d) each segment having inner and outer free ends that are nominally located at distances r1 and r2, respectively, from the axis of the ring within which it is mounted, the inner free ends of the segments of all the rings defining a central aperture of length L within said ring assembly; and

(e) means for mounting the segments in said each ring such that the distances r1 and r2 of each segment are nonuniformly but functionally related to the axial extent L of the assembly so as to produce a homogeneous magnetic field transverse to the axis of the ring assembly.

4,703,277

METHOD AND APPARATUS FOR OBTAINING PROPERTIES OF SUBSURFACE FORMATIONS FROM TEXTURAL MODELS DERIVED FROM FORMATION PARAMETERS

William E. Kenyon; Paul L. Baker; Pabitra N. Sen, all of Ridgefield, and Jayanth R. Banavar, Avon, all of Conn., assignors to Schlumberger Technology Corp., New York, N.Y.

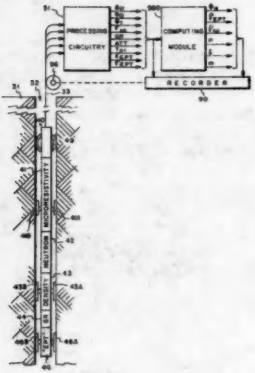
Filed Apr. 13, 1984, Ser. No. 599,888
Int. Cl.[4] G01V *3/18, 3/38*
U.S. Cl. 324—323 92 Claims

1. A method for determining a property of formations surrounding a borehole, comprising the steps of:

deriving a measured electrical parameter of a formation surrounding the borehole from a logging device moveable through the borehole;

formulating a textural model of the formation as a function of the electrical parameter, the textural model being a bimodal model in which the formation matrix includes a

fraction of spherical grains and a complementary fraction of platey grains; and



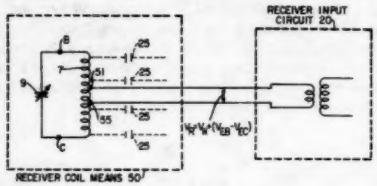
determining a property of the formation from the textural model.

4,703,278

WELL LOGGING DISC COIL RECEIVING MEANS AND METHOD

Theodore W. Nussbaum; Keith R. Tooker, and Percy T. Cox, all of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 9, 1984, Ser. No. 658,928
Int. Cl.[4] G01V *3/26*
U.S. Cl. 324—344 **27 Claims**



1. A well logging receiver coil system comprising:

coil means for having an electromagnetic field induce a current therein representative of the strength of the electromagnetic field, the coil means having two end points and a mid-point located between the two end points;

variable capacitor means connected across said coil means for forming a resonant circuit with said coil means tuned to a predetermined frequency; and

pick-off means, said pick-off means being connected to the coil means at two connection points on the coil means in a manner so that two connection points are equidistant from the mid-point of the coil means and with each connection point being located between the mid-point and an end point, for providing a signal representative of the magnetic component of the electromagnetic field strength and having substantially no electric field component of the electromagnetic field strength.

4,703,279

METHOD OF INTERPRETING IMPEDANCE DISTRIBUTION OF AN EARTH FORMATION PENETRATED BY A BOREHOLE USING PRECURSOR DATA PROVIDED BY A MOVING LOGGING ARRAY HAVING A SINGLE CONTINUOUSLY EMITTING CURRENT ELECTRODE AND A MULTIPLICITY OF POTENTIAL ELECTRODES

Carroll W. Chapman, Anaheim, and Jorg A. Angehrn, Brea, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jul. 31, 1985, Ser. No. 761,127
The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.
Int. Cl.[4] G01V *3/18*
U.S. Cl. 324—366 **17 Claims**

1. Method of synthesizing the true response characteristics of a combination of different hole-centered electric logging tools in a variety of difficult borehole conditions as provided by (1) determining impedance values of an earth formation penetrated by a borehole filled with a drilling mud of resistivity (Rm), and forming impedance matices with said impedance values, and (2) selectively manipulating the impedance values of the impedance matrixes so as to synthesize operations of different hole-centered tools over an associated depth increment with surprising accuracy, wherein each of said impedance matrices is associated with a matrix gather indexed to one of a series of finite, overlapping depth scan increments of the formation measured along the borehole, each scan increment being dependent on the array length L of an electrode array to define shallow and deep depth markers as well as being centrally indexed to the depth in the borehole of a mid-central electrode assembly of the array at the time of data collection, and thereby provide a true indication of the formation resistivity (Rt) even though the formation is interspaced from the borehole by an invaded zone of resistivity (Rxo) of unknown lateral extent due to drilling mud filtrate invasion, comprising the steps of:

(i) calibrating an array of hole centered M electrode assemblies of equal incremental electrode spacing "a" to obtain sets of calibration factors normalized to known voltage patterns in a known resistivity zone of response, said electrode assemblies havinq a known internally ordered numbering index, said sets of calibration factors each being addressable as a function of borehole conditions including said difficult borehole conditions as well as by particular synthetic computer focused array type;

(ii) positioning a field array in the borehole, said array comprising a mid-central electrode assembly comprising a current electrode and a potential electrode, and a series of additional electrode assemblies each comprising a poten-

tial measuring electrode only, the absolute depth of at least one electrode assembly being continuously known with respect to a predetermined depth datum level measured from the earth's surface;

(iii) continuously moving the array along the borehole, and continuously injecting current of a known value from the current electrode of the mid-cental assembly, through the drilling mud of resistivity (Rm) and the invaded zone of resistivity Rxo and thence into the formation of resistivity Rt;

(iv) during current injection, measuring the absolute potential at each potential electrode as well as the potential differences between adjacent pairs of potential electrodes in a rapid manner wherein the potential measurements can be indexed to common logging stations of a series of equi-spaced logging stations located along the borehole having a spacing incremental distance of "a" where "a" is the distance between adjacent electrode assemblies;

(v) calculating impedance values from the measured absolute and difference potential values and their associated injection currents, each value being indexed to said known internal indexing numbers of active current and potential electrodes used in the measurements;

(vi) reindexing the impedance values into impedance entries of a series of overlapping matrix gathers, each gather being associated with a predetermined segment of said formation equal in vertical extent, to M logging stations, and comprising M×M impedance entries where 2M−1 the largest number of the numbering index of the electrode assemblies comprising said array and in which the ratio of the number of difference impedance entries to absolute entries is about M−1:1;

(vii) inverting each to form inverted oberlapping matrix gathers;

(viii) generating computer focused response parameters using voltage patterns of step (i) and said inverted overlapping matrix gathers;

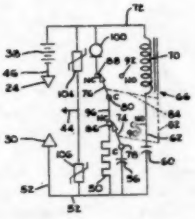
(ix) searching sets of calibration factors of step (i) whereby the difficult borehole condition is deduced even in the presence of high true resistivity to mud resistivity contrasts and irrespective of the fact that synthetic sets of potential patterns have been used as initiators of the subsequently generated computer focused response parameters.

4,703,280

FLUID CONDUCTIVITY SENSOR CONTROLLING AN ELECTRO EXPLOSIVE DEVICE

Francis M. Miller, Snyder, N.Y., assignor to Conax Florida Corporation, St. Petersburg, Fla.

Filed Aug. 30, 1985, Ser. No. 771,354
Int. Cl.⁴ G01N *27/02*; F23Q *7/02*
U.S. Cl. 324—439 **21 Claims**



1. A circuit for operating a load in response to a predetermined condition in the electrical conductivity of a fluid comprising:

(a) a pair of sensing electrodes adapted to be exposed to the fluid for defining a circuit path therebetween when the fluid has electrical conductivity;

(b) a voltage source connected to one of the electrodes;

(c) a current conducting load coupled to another of the electrodes;

(d) a firing circuit branch connected to the other electrode;

(e) a conductivity sensing circuit branch connected to the other electrode and to said voltage source; and

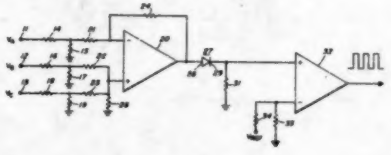
(f) switching means connected to said sensing circuit branch in a manner controlled thereby and in controlling relation to said firing circuit branch for connecting said firing circuit branch in a manner preparing said firing circuit branch for firing in response to current flow in said conductivity sensing branch when said electrodes are exposed to fluid having a predetermined condltion of conductivity and for connecting said firing circuit to said load a predetermined time thereafter in a manner completing a circuit including said load and said firing circuit branch to provide current flow from said firing circuit branch through said load for operating said load.

4,703,281

CLOCKING PULSE GENERATOR

Wen T. Chen, West Newton, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jan. 15, 1981, Ser. No. 225,178
Int. Cl.⁴ H03K *5/08, 17/40*; G06G *7/12*
U.S. Cl. 328—28 **5 Claims**



1. A clocking pulse generator comprising

means for receiving voltage from an alternating current electrical power source;

a vector summing circuit coupled to said receiving means for providing a non-zero resultant vector for various conditions of voltage applied to said means; and

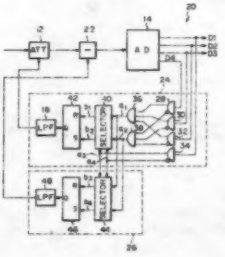
a voltage comparator, coupled to receive said non-zero resultant vector, for providing clocking pulses therefrom.

4,703,282

DIGITAL DEMODULATION SYSTEM

Yasuharu Yoshida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 26, 1986, Ser. No. 878,746
Claims priority, application Japan, Jun. 29, 1985, 60-141529; Jul. 10, 1985, 60-149931
Int. Cl.⁴ H03D *3/18*
U.S. Cl. 329—50 **2 Claims**



1. An automatic gain control circuit for controlling an input level of a multi-level discriminator to an optimum level to

discriminate a multi-level baseband signal in terms of multiple levels, comprising:

a variable attenuator responsive to one of an intermediate frequency band or a baseband and interconnected to the multi-level discriminator for varying all input level of the discriminator;

identifying means for identifying in response to an output of the multi-level discriminator a first to a third regions which are set up in such a manner as to include outermost points and an innermost point with respect to a demodulated signal; and

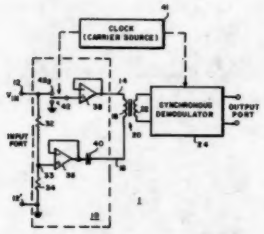
logic means for subjecting one of an output of said identifying means and an output of said identifying means which includes the multi-level discriminator to generate a control signal for controlling said variable attenuator.

4,703,283

ISOLATION AMPLIFIER WITH T-TYPE MODULATOR

Howard Samuels, 26 Charlotte Rd., Newton, Mass. 02740

Filed Feb. 24, 1986, Ser. No. 832,177
Int. Cl.[4] H03F *3/38*
U.S. Cl. 330—9 **13 Claims**



1. In an isolation amplifier for providing transmission of a normal-mode input signal from a first, i.e., input, port to a second, i.e., output, port, while providing galvanic isolation between said input port and said output port, such isolation amplifier having an isolation transformer which has primary and secondary windings, a carrier signal source for supplying a periodic carrier signal, a modulator for supplying to the primary winding of the transformer the carrier signal modulated by the input signal, and a demodulator for synchronously demodulating the modulated signal appearing on the secondary winding of the transformer, the improvement comprising the modulator being a full-wave modulator including

a. means for supplying to the transformer primary winding an attenuated representation of the input signal waveform wherein said attenuation is at least about fifty-per cent; and

b. means to protect the transformer primary winding from the effects of thermal drift in said means for supplying an attenuated representation.

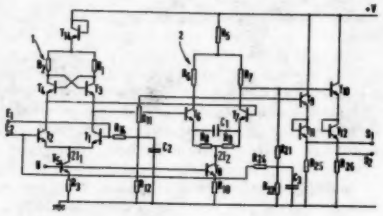
4,703,284

HIGH-FREQUENCY AMPLIFIER

Stefan Barbu, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 8, 1986, Ser. No. 861,036
Claims priority, application France, May 10, 1985, 85 07123
Int. Cl.[4] H03F *3/45*
U.S. Cl. 330—259 **5 Claims**

1. A high-frequency amplifier comprising at least one differential stage which comprises a first and a second transistor whose emitters, which are coupled to each other, are connected to a first current source, whose bases receive the input signals, and whose collectors are connected to the emitters of a third transistor and a fourth transistor, respectively, whose collectors are each connected to a supply-voltage source by a first bias resistor and a second bias resistor, respectively, the bases of the third transistor and the fourth transistor being connected to the collectors of the fourth transistor and the third transistor, respectively, said differential stage constituting a differential input stage, further comprising an output stage which comprises a fifth transistor (T_6) and a sixth transistor (T_7) whose bases are connected to the collectors of the first transistor (T_1) and the second transistor (T_2), respectively, whose collectors are each connected to said supply-voltage



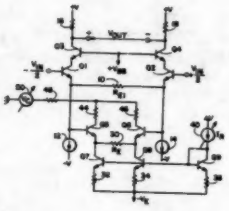
source by a third bias resistor and a fourth bias resistor (R_6, R_7), and whose emitters are connected to each other by a first capacitor (C_1) in parallel with a first resistive divider bridge having first and second elements (R_8, R_9) whose center is connected to a second current source (R_{10}, T_8), the elements (R_8, R_9) of the first resistive divider bridge, the first capacitor (C_1) and the bias resistors being chosen to provide for the amplifier an overall gain higher than unity in its operating frequency range.

4,703,285

WIDEBAND AMPLIFIER WITH ACTIVE HIGH-FREQUENCY COMPENSATION

James Woo, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 23, 1986, Ser. No. 855,533
Int. Cl.[4] H03F *3/45*
U.S. Cl. 330—260 **4 Claims**



1. In a differential amplifier including a pair of input transistors having an impedance coupled between the emitters thereof, an active high-frequency compensation circuit, comprising:

a pair of compensation transistors each having a base connected to an emitter of a respective input transistor, wherein the emitters of said compensation transistors are coupled together and the collectors of said compensation transistors are coupled together, said compensation transistors each having a predetermined base-to-collector capacitance;

first control means for varying the conduction of said compensation transistors; and

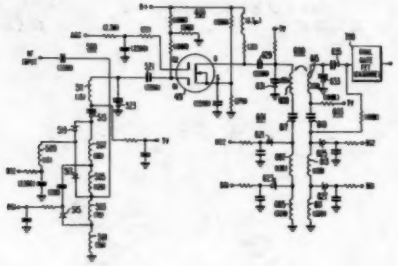
second control means for varying the collector-base voltage of said compensation transistors.

4,703,286

DUAL GATE TUNABLE OSCILLATOR

Max W. Muterspaugh, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 26, 1986, Ser. No. 935,440
Int. Cl.[4] H03B 5/00
U.S. Cl. 331—117 FE 11 Claims



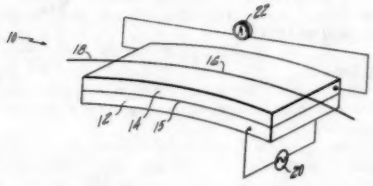
1. Apparatus including a tunable oscillator, comprising:
a dual gate field effect transistor (FET) having first and second gate electrodes, a source electrode and a drain electrode;
impedance means for coupling said source electrode to a point of reference potential;
oscillation conditioning means connected between said first gate electrode and said source electrode for conditioning said FET to oscillate in a predetermined frequency range;
frequency determining means including a varactor diode which exhibits a capacitance which changes in response to changes in the magnitude of a tuning voltage and an inductance element coupled to said first gate electrode for determining the oscillation frequency at which said FET oscillates;
bypass means for effectively connecting said second gate electrode to said point of reference potential through a negligible impedance in said predetermined frequency range; and
utilization means coupled to said drain electrode for receiving an output signal at said oscillation frequency.

4,703,287

PHASE MODULATOR FOR FIBER-OPTIC SENSORS

Joseph T. Fournier, Jr., Glastonbury, and Richard E. Swarts, Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 22, 1985, Ser. No. 768,308
Int. Cl.[4] G02F 1/05; G02B 5/08
U.S. Cl. 332—7.51 16 Claims



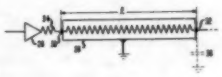
1. A piezoelectric phase modulator for having an optical fiber bonded thereto for use in a fiber-optic sensor, comprising:
a first piece made of a first piezoelectric material; and
a second piece made of a second piezoelectric material having greater stability but a lesser converse peizoelectric effect than said first piece, said second piezoelectric piece bonded to said first piezoelectric piece so that said second piece will experience a converse piezoelectric effect comparable in magnitude to that of said first piece when said first piece is subjected to suitable excitation which tends to bend both pieces, said second piece having a channel for having the optical fiber bonded to said second piece therein.

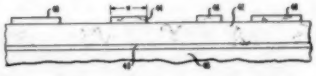
4,703,288

INTERCONNECTION LINES FOR WAFER-SCALE-INTEGRATED ASSEMBLIES

Robert C. Frye, Piscataway, and King L. Tai, Berkeley Heights, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 3, 1985, Ser. No. 719,533
Int. Cl.[4] H01P 3/08
U.S. Cl. 333—1 10 Claims





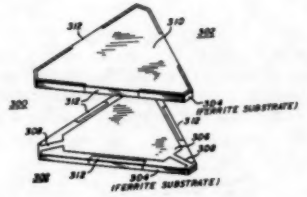
7. A wafer-scale-integrated assembly comprising
a substrate having a top surface,
a ground plane overlying the top surface of said substrate,
a dielectric layer overlying said ground plane,
and a plurality of lossy interconnect lines on said dielectric layer, said lines having respective input ends and including a maximum-length line and a line that is shorter than said maximum-length line, the width of said maximum-length line being greater than the width of said shorter line and active drivers respectively connected to the input ends of said lines.

4,703,289

DISTRIBUTED RESONATOR STRIPLINE CIRCULATOR AND METHOD FOR FABRICATING SAME

Peter A. Kwitkowski, Elgin; Peter Nanni, Hoffman Estates; Carl Missele, Elgin; Norman E. O'Shea, Lake in the Hills, and Anthony M. Pirih, Roselle, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 17, 1985, Ser. No. 809,984
Int. Cl.[4] H01P 1/387, 11/00
U.S. Cl. 333—1.1 10 Claims



1. A distributed resonator stripline circulator device for operation in a magnetic field and having at least three input-/output ports, comprising:
a first and second triangularly shaped ferrite substrate, each having a substantially planar top and bottom portion, said top portion being substantially covered by a ground plane deposited thereon and said bottom portion having a resonator pattern deposited thereon including at least three feedlines extending approximately to the edge of said

substrate at said input/output ports, said circulator including means for controlling the loading factor thereof comprising ground plane extensions from said top portion to said bottom portion of each of said triangularly shaped substrates, said extensions being substantially centered along each side of each of said triangularly shaped substrates, said circulator being constructed by electrically coupling said first and second triangularly shaped ferrite substrates, resonator patterns facing, at said controlling means and said feelines.

4,703,290

ACOUSTIC WAVE FILTER

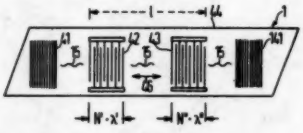
Peter Zibis, Munich, and Richard Veith, Unterhaching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Oct. 15, 1985, Ser. No. 787,111

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1984, 3438246

Int. Cl.[4] H03H *9/64*

U.S. Cl. 333—195 **4 Claims**



1. An acoustic wave filter having a bandwidth and a center frequency f_2 comprising a piezoelectric substrate with a planar surface, first and second digital structures (**42, 43**) which are finger structures with broad bandwidths, both digital structures are mounted on said planar surface of said substrate, a further digital structure, (**41, 141**) mounted on said planar surface of said substrate, said further digital structure has a center frequency f_2 and a bandwidth F_2 which is at least one half as broad band as said first and second digital structures, and whereby the center frequency f_1 of said first and second digital structures is shifted relative to the center frequency f_2 according to the equation

$$f_1 = \frac{f_2}{1 \pm \frac{1}{N-1}}$$

wherein N is a wavelength number, characterized in that the resonant frequency f'_1 of said first digital structure (**42**) is determined using the negative sign and the resonant frequency f''_1 of said second digital structure is obtained using the plus sign and:

$$f_1 = \frac{f_2}{1 - \frac{1}{N'-1}}, \text{ and } f''_1 = \frac{f_2}{1 + \frac{1}{N''-1}},$$

wherein N' is the number of wavelengths λ' in the bandwidth of said first digital structure (**42**), and N" is the number of wavelengths λ''in the bandwidth of said second digital structure (**43**) and whereby N' and N" are numerical values selected to be about the same and wherein said first and second digital structure have different physical dimensions which causes them to have different electrical characteristics.

4,703,291

DIELECTRIC FILTER FOR USE IN A MICROWAVE INTEGRATED CIRCUIT

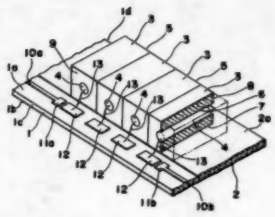
Toshio Nishikawa, Nagaokakyo, and Tadahiro Yorita, Kanazawa, both of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Mar. 10, 1986, Ser. No. 837,765

Claims priority, application Japan, Mar. 13, 1985, 60-51293

Int. Cl.[4] H01P *1/202, 1/203, 7/04*

U.S. Cl. 333—202 **14 Claims**



1. A microwave integrated circuit including a dielectric filter, comprising:

a microwave integrated circuit substrate made of a dielectric material and having a microwave integrated circuit on at least one side of said substrate and which is complete except for a filter means;

input and output strip lines deposited on said substrate and extending from said microwave integrated circuit and having ends in spaced opposed relation along said substrate;

a ground electrode depositioned on the other side of said substrate opposite the space between the ends of said strip lines; and

wherein said dielectric filter comprises

at least one capacitance electrode deposited on said one side of said substrate between said input and output strip lines and being capacitively connected thereto; and

at least one dielectric resonator mounted on said substrate, said dielectric resonator having a body made of a dielectric material with a hole therein, an inner electrode deposited on the inner surface of said body defining said hole, and an outer electrode deposited on the outer surface of said body, said inner electrode being electrically connected to said capacitance electrode and said outer electrode being electrically connected to said ground electrode.

4,703,292

TUNING CIRCUIT APPARATUS

Taiwa Okanobu, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 21, 1986, Ser. No. 831,518

Claims priority, application Japan, Mar. 4, 1985, 60-042380; Jun. 13, 1985, 60-128480

Int. Cl.[4] H03J *3/18*

U.S. Cl. 334—15 **7 Claims**

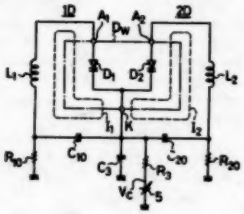
1. A tuning circuit apparatus having a plurality of tuning circuits whose tuning frequencies are varied in a ganged fashion, comprising:

a composite varactor device including a plurality of Varicap diodes formed on a common semiconductor substrate and each having first and second electrodes, said first electrodes of said Varicap diodes being led out to independent terminals while said second electrodes of said Varicap diodes are led out to a common terminal;

a plurality of tuning coils each having first and second ends, said first ends being respectively connected to said independent terminals of said plurality of Varicap diodes;

a plurality of capacitors respectively having first sides con-

nected directly to said second ends of said tuning coils and second sides connected directly to said common terminal of said composite varactor device; and



control voltage means for parallelly applying a control voltage to said Varicap diodes.

4,703,293

POLARIZED ELECTROMAGNETIC ACTUATOR DEVICE

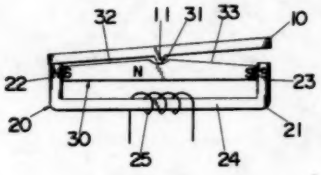
Kenji Ono, and Kazuhiro Nobutoki, both of Matsusaka, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Mar. 6, 1986, Ser. No. 836,734

Claims priority, application Japan, Mar. 25, 1985, 60-60093

Int. Cl.⁴ H01H *51/22*

U.S. Cl. 335—80 **3 Claims**



1. A polarized electromagnetic actuator device comprising:

an armature pivotally supported for movement about a pivot axis between two different angularly displaced positions;

an electromagnet having a core, an exciter coil wound only around the core, and a pair of pole members extending from the ends of the core toward the ends of the armature on either side of the pivot axis;

a bar-shaped three-pole magnetized permanent magnet disposed between the free ends of the sole members to extend along the armature in a closely adjacent relationship thereto, said permanent magnet being magnetized to have end poles of the same polarity at its lengthwise ends and to have a center pole of the opposite polarity to the end poles intermediate its ends so as to produce opposing first and second flux paths between the permanent magnet and the armature; said first flux path circulating between the center pole and the one of the end poles through one end portion of the permanent magnet and the adjacent end portion of the armature, and said second flux path circulating between the center pole and the other end pole through the other end portion of the permanent magnet and the adjacent end portion of the armature; said first and second flux paths extending through a common air gap between the permanent magnet and the armature in proximity to the pivot axis; and

said center pole being offset from the pivot axis of the armature along the length of the permanent magnet so that said common air gap is correspondingly offset therefrom to thereby produce a torque on the armature tending to rotate the armature about the pivot axis toward the one of the angularly displaced positions.

4,703,294

REMOTELY CONTROLLABLE RELAY

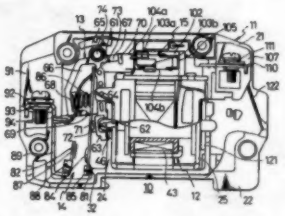
Yoichi Yokoyama; Hiroaki Hamaguchi, both of Kadoma, and Masatoshi Yamamoto, Tsu, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Dec. 13, 1985, Ser. No. 808,648

Claims priority, application Japan, Dec. 24, 1984, 59-278584; Dec. 25, 1984, 59-275932

Int. Cl.⁴ H01H *67/02*

U.S. Cl. 335—121 **6 Claims**



1. A remotely controllable relay comprising an electromagnet means having a coil arranged for feeding thereto an energizing current in opposite directions and a movable member coupled to a core reciprocatingly movable along the axial directions of said coil, said movable member being a movable projection integral with said movable core for forward and backward motion therewith on one side of said electromagnet means in said axial direction of said coil; a rocker, pivotally supported to a coil frame of said electromagnetic means and pivotally connected to said moveable projection of said moveable core at one end portion remote from said pivotally, supported position, linked to said movable member to be rocked forward and backward in response to said reciprocating movement of said core; a movable contactor electrically connected to a load and linked to said rocker for following said rocking of said rocker, and a fixed contactor electrically connected to said load, said rocker, movable, and fixed contactors being disposed on one side of the electromagnet means, said movable contactor following the rocking of the rocker; an auxiliary contact means actuable with said rocking of said rocker for cutting said current fed to said electromagnetic means, said rocker forming part of a switching-contact operator means which includes a small holding chamber provided on one side of said rocker opposite to said coil frame, said chamber including an opening for passing therethrough said movable contactor, and a biasing spring disposed in said chamber for providing to said movable contactor a contacting pressure with respect to said fixed contactor and said movable member being shifted in one of said axial direction of the coil in reponse to said current feeding direction to said electromagnet means to turn ON and OFF as associated power source circuit for said load.

4,703,295

ELECTROMAGNETIC RELAY HAVING PRECISE POSITIONAL RELATIONSHIP BETWEEN ELEMENTS

Kunihisa Fujii, Saku; Noboru Tomono, Minamisaku; Tetsuo Kito, Saku, and Kosei Yoshino, Komoro, all of Japan, assignors to Takamisawa Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 396,272, Jul. 8, 1982. This application Sep. 9, 1985, Ser. No. 774,186

Claims priority, application Japan, Jul. 20, 1981, 57-112121

Int. Cl.⁴ H01H *67/02*

U.S. Cl. 335—129 **3 Claims**

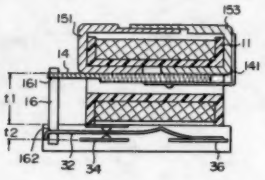
1. An electromagnetic relay comprising:

an electromagnet portion including a bobbin, a coil wound on said bobbin, a magnetic pole piece, and a magnetic yoke inserted in said bobbin, an armature of a straight bar shape arranged adjacent to said magnetic pole piece, and

a card outside of said bobbin and coupled to a portion of said armature extending outside of said bobbin;

a spring holding portion including a base block, a first fixed contact spring and a movable contact spring, said first fixed contact spring and said movable contact spring being embedded in said base block, said movable contact spring being adapted to be driven by said card; and

a second fixed contact spring located between and in contact with said bobbin, at an end of the bobbin nearest said card,



and an upper face of said holding portion, and wherein said second fixed contact spring has at least a first hole therein, corresponding and engageable with a projection on said base block so that said second fixed contact spring is correctly located when joined with said base block, such that said electromagnet portion, said second fixed contact spring and said spring holding portion may be assembled by placing said second fixed contact spring between said electromagnet portion and said holding portion.

4,703,296

THERMAL REED SWITCH ASSEMBLY

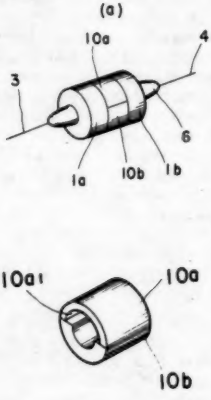
Tomio Katoh, Tokyo, Japan, assignor to TDK Corporation, Tokyo, Japan

Filed Feb. 6, 1986, Ser. No. 826,634

Claims priority, application Japan, Feb. 7, 1985, 60-16074[U]

Int. Cl.[4] H01F *27/30*

U.S. Cl. 335—208 **12 Claims**



1. A thermal reed switch assembly comprising: a reed switch including two magnetic reed pieces with tip ends disposed as contacts in a mutually overlapping relation and a tube covering said two magnetic reed pieces including said contacts;

two cylindrical permanent magnets disposed around said tube in the vicinity of said contacts and spaced from each other; and

a cylindrical thermal magnetic body disposed between said two cylindrical permanent magnets and comprising two semicylindrical thermal magnetic members each having mutually different magnetic transition points and including ends of said two semicylindrical thermal magnetic members held in abutment against each other in a sandwiching relation to said reed switch.

2. A thermal reed switch assembly comprising: a reed switch having contacts in two magnetic reed pieces; at least two permanent magnets disposed in their peripheral vicinity of said contacts of said reed switch, said at least two permanent magnets having poles which are directionally coincident with the axis of said reed pieces; and at least two thermal magnetic members each having mutually different magnetic transition points, said thermal magnetic members sandwiching said reed switch therebetween in the direction intersecting the axis of said reed switch, an inner diameter of one thermal magnetic member being larger than at least a second thermal magnetic member therein increasing the sectional area ratio of said thermal magnetic members.

4,703,297

PERMANENT MAGNET TYPE LINEAR ELECTROMAGNETIC ACTUATOR

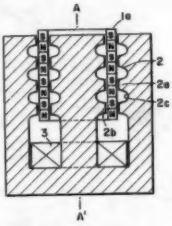
Nagahiko Nagasaka, Iruma, Japan, assignor to Kabushiki Kaisha Yaskawa Denki Seisakusho, Japan

Filed Dec. 16, 1986, Ser. No. 942,464

Claims priority, application Japan, Feb. 18, 1986, 61-33589

Int. Cl.[4] H01F *7/08*

U.S. Cl. 335—222 **3 Claims**



1. A permanent magnet type linear electromagnetic actuator comprising:

an armature made of a permanent magnet of a hollow cylindrical configuration and held movable in its axial direction;

a stator made of an electro-magnet having a magnet core formed into two portions which are placed outside and inside of said hollow cylindrical permanent magnet so as to apply a unipolar magnetic field therethrough;

a plurality of inductor teeth formed at a pitch along said of the surfaces of said core portions opposing outwardly and inwardly to said permanent magnet through air gaps; and

means for applying an exciting current to a coil wound around said magnetic core of said electromagnet.

4,703,298

THERMOSTAT WITH CERAMIC MOUNTING PINS OF RESISTIVE MATERIAL

Philips M. Gerson, Velp, Netherlands, assignor to Texas Instruments Incorporated, Dallas, Tex.

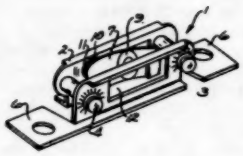
Filed Nov. 4, 1986, Ser. No. 927,193

Int. Cl.[4] H01H *61/02, 37/04*

U.S. Cl. 337—102 **3 Claims**

1. A thermostat comprising a bimetal switch element reacting upon changes in temperature, which on one of its ends is fastened on a frame and on another end is provided with a movable electric contact adapted to engage a fixed contact provided on the frame, said frame comprising two mutually parallel sheet-like contact carries forming a base unit, respectively mounting the bimetal switch element and the fixed contact, through which two parallel pins are extending for

connection of both contact carriers and on which pins the contact carriers, with a tight fit, are slidable to and fro relative to one another to be held in permanent mutually parallel relation during such sliding, characterized in that at least one of the



pins is made of PTC material, from which pins, when energized, electrically generated heat can be transferred by conduction, convection and radiation to the bimetal switch element of the thermostat.

4,703,299

HIGH CURRENT INTERRUPTING FUSE WITH ARC QUENCHING MEANS

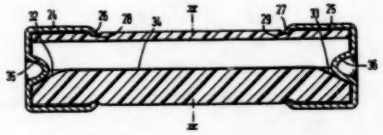
Leendert Vermij, Buren, Netherlands, assignor to Littelfuse-Tracor B.V., Utrecht, Netherlands

Filed Apr. 3, 1986, Ser. No. 847,951

Claims priority, application Netherlands, Apr. 4, 1985, 8501004

Int. Cl.⁴ H01H *85/04, 85/14*

U.S. Cl. 337—158 **5 Claims**



1. A fuse comprising a fuse element arranged between two terminals in an insulating envelope, said fuse element comprising an appropriate electrically conductive material and being on opposite ends electrically connected with said terminals, characterized in that said envelope comprises a first longitudinal fuse element-supporting segment on an inner surface of which is supported a fuse element, and a longitudinal hood-forming segment longitudinally confronting and substantially spaced from and enclosing the inner side of said first envelope segment, and said terminals being in the form of end caps at opposite ends of said envelope which engage around and aid in securing together the confronting envelope segments, said end caps each having a centrally inwardly directed portion depressed from the end surface, said first envelope segment being provided adjacent each of its ends with a depression in its surface, over which the end of said fuse element extends, the arrangement being such that the inwardly directed portion of each end cap is in pressing electrical contact with the end of the fuse element thereat.

4,703,300

TIME LAG ELECTRICAL FUSE

Aldino J. Gaia, St. Louis, Mo., assignor to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 796,222, Nov. 8, 1985, abandoned. This application Jan. 7, 1987, Ser. No. 4,299

Int. Cl.⁴ H01H *85/04*

U.S. Cl. 337—164 **10 Claims**

1. A time lag fuse comprising,

a time delay fuse;

at least one electrical resistance heating means connected in a series circuit with said time delay fuse, and located in intimate heat transfer relationship with said time delay fuse;

a short circuit fuse connected in series in said series circuit, said short circuit fuse being enclosed in a first elongated insulating housing having first and second ends, first and second electrically conductive end caps secured to and closing said first and second ends respectively of said first insulating housing, and said first and second electrically conductive end caps being connected in said series circuit;

a second elongated hollow insulating housing having first and second ends, enclosing said time delay fuse, said electrical resistance heating means and said short circuit fuse; and

third and fourth electrically conductive end caps secured to and closing said first and second ends respectively of said second insulating housing, said series circuit being connected between said third and fourth end caps, said end caps being connected in series with a circuit to be protected, such that overload current flow in said at least one electrical resistance heating means will result in the generation and transfer of heat from said at least one electrical resistance heating means to said time delay fuse, to cause said time delay fuse to interrupt, after a predetermined time delay, an overload current flow in the circuit to be interrupted, which overload current is of a lesser magnitude than would otherwise be interrupted by said time delay fuse.

4,703,301

THERMALLY-CONTROLLED ELECTRICAL SWITCHING ELEMENT, PARTICULARLY TEMPERATURE REGULATOR OR TEMPERATURE LIMITER

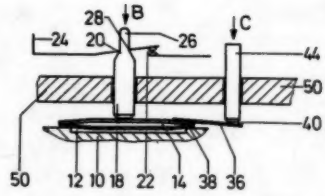
Walter Hollweck, and Karlheinz Eberl, both of Nuremberg, Fed. Rep. of Germany, assignors to Inter Control Hermann Kohler Elektrik GmbH & Co. KG, Nuremberg, Fed. Rep. of Germany

Filed May 1, 1986, Ser. No. 858,207

Claims priority, application Fed. Rep. of Germany, May 4, 1985, 3516041; Jul. 13, 1985, 3525093

Int. Cl.⁴ H01H *37/54, 37/70*

U.S. Cl. 337—367 **24 Claims**



1. In a thermically controlled switching unit of type comprising a socket having arranged therein in parallel orientation a bimetallic spring plate and a further plate, said spring plate being adapted to deflect in a first direction upon occurrence of a first spring temperature and to deflect in a second direction opposite said first direction, upon occurrence of a second spring temperature diverse from said first spring temperature, said further plate being deflectable in said first direction by said spring plate upon such first direction deflection thereof and

being also deflectable in said second direction, and a switch element operable upon such first direction deflection of said further plate to be placed in first state and otherwise in a second state diverse from such first state, the improvement comprising a control element connected to said further plate for deflecting said further plate in said second direction.

4,703,302

RESISTANCE LADDER NETWORK

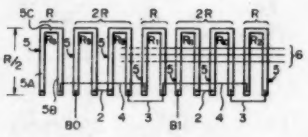
Youzi Hino, and Hironobu Ogawa, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Sep. 20, 1984, Ser. No. 652,686

Claims priority, application Japan, Sep. 20, 1983, 58-173735

Int. Cl.[4] H01C *3/12*

U.S. Cl. 338—293 **9 Claims**



1. A resistance ladder network used in an input portion of a D/A converter and formed in an LSI circuit, said resistance ladder network comprising:

a plurality of resistors connected in a ladder format to form part of the ladder network, each of said resistors being generally parallel with one another, wherein each resistor is positioned laterally with respect to the length of the ladder network, and wherein each of said resistors has a U-shape or V-shape having a pair of legs electrically coupled at one end thereof, and each leg having a contact end opposite said one end such that each of said resistors have their contact ends on one lateral side of said ladder network, and their one ends on the opposite lateral side of said ladder network, and

wherein conductive wirings interconnecting said resistors are formed on a different substrate level of said LSI circuit from said resistors, and run generally parallel to the length of said ladder network, such that space is provided on the same substrate level as said conductive wirings for other wirings to run along the length of the ladder network superimposed on said resistors.

4,703,303

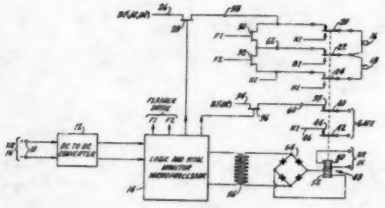
SOLID STATE RAILROAD LIGHTS/GATE CONTROLLER

Ronald W. Snee, Wilmington, Del., assignor to Safetran Systems Corporation, Louisville, Ky.

Filed Apr. 7, 1986, Ser. No. 848,761

Int. Cl.[4] B61L *15/00*

U.S. Cl. 340—47 **4 Claims**



1. A crossing lights/gate controller for effecting operation of the crossing lights and lowering of the crossing gate during normal train operating conditions and during a controller failure mode including,

a train sensing input providing one signal condition when the approach of a train is sensed and another signal condition when no train is sensed,

a gate control circuit which has power supplied thereto to maintain the gate in a raised position when the train sensing input indicates a no train condition,

a lights control circuit which has power supplied thereto to operate the lights in a flashing condition when the train sensing input indicates the approach of a train,

a solid state logic and monitor circuit connected to said input, gate control circuit, and lights control circuit, said logic and monitor circuit applying and removing power to said gate and lights control circuits in accordance with the signals at said input,

a fail/safe relay connected to said logic and monitor circuit and said gate and lights control circuits, which relay automatically removes power to said gate control circuit and applies power to operate the lights in the event no power is applied thereto,

and a direct connection between said input and said fail/safe relay to insure that said relay is responsive to a signal at said input.

4,703,304

SHIFT INDICATOR SYSTEM FOR VEHICLE

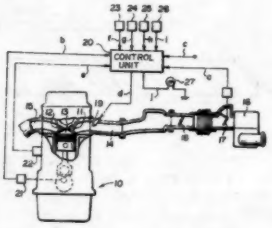
Taku Muguruma, and Seiji Ohuchi, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Jul. 23, 1986, Ser. No. 888,362

Claims priority, application Japan, Jul. 24, 1985, 60-164941

Int. Cl.[4] F16H *5/66*

U.S. Cl. 340—52 R **18 Claims**



1. A shift indicator system for a vehicle comprising an engine speed detecting means for detecting the engine speed, an indicator means for providing an indication for directing upshifting, and a controller which includes a comparator means which receives the output of the engine speed detecting means and compares the detected engine speed with a preset speed, an adverse condition detecting means for detecting an adverse condition which can adversely affect the engine output power, and a correcting means which receives the output of the adverse condition detecting means and increases said preset speed when the adverse condition is detected, and permits said indicator means to provide the indication for directing upshifting when the detected engine speed is higher than the preset engine speed, wherein said adverse condition is that the intake air density is low.

4,703,305

ADDRESSING SMECTIC DISPLAYS

Peter J. Ayliffe, Stansted, England, assignor to STC plc, London, England

Filed Jul. 12, 1985, Ser. No. 754,544

Claims priority, application United Kingdom, Jul. 12, 1984, 8417829

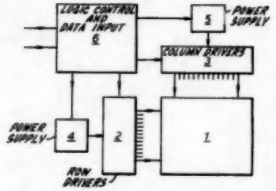
Int. Cl.[4] G09G *3/36*

U.S. Cl. 340—784 **3 Claims**

3. A method of operating a display device incorporating a

matrix addressed smectic cell, wherein pixels of the cell are addressed by means of a strobe pulse applied to a selected row in synchronism with the parallel input of data pulses to column electrodes and wherein the voltage excursion of the data pulses is less than a predetermined threshold voltage V_T, said method comprising:

(a) for row data that is to be entered a whole row at a time, first erasing said whole row and then entering said row data using a strobing pulse of a first duration whose voltage excursion is greater than twice said predetermined threshold voltage V_T, and



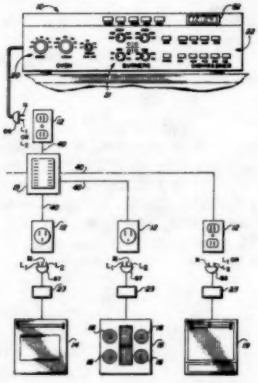
(b) for segment data that is to be entered into a particular row in a sequence of time-spaced segments, first erasing said particular row in its entirety and then entering said segment data pertaining to said particular row using a sequence of time-spaced segments without any intervening erasing step, using a sequence of strobing pulses each of a second duration longer than said first duration and whose voltage is less than twice said predetermined threshold voltage V_T.

4,703,306

APPLIANCE SYSTEM

William D. Barritt, Greenfield, Ind., assignor to The Maytag Company, Newton, Iowa

Filed Sep. 26, 1986, Ser. No. 912,779
Int. Cl.[4] H04M *11/04*
U.S. Cl. 340—310 CP **12 Claims**



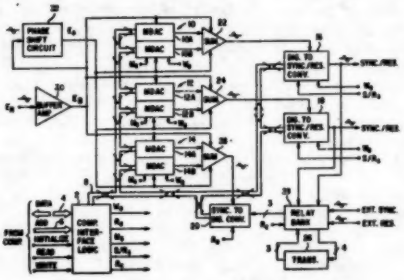
1. An appliance system including a plurality of appliances in associated proximity to each other and operable in accordance with a control strategy with each appliance being connected to an alternating current power supply for energization and control of the appliances, the combination comprising: at least a pair of appliances to be controlled with each having controllable operating components for providing appliance operations and being substantially free of user-operable controls; power lines connected to said alternating current power supply for energizing said appliances; master control means connected to said power lines and including logic control means for stored operational information dedicated to controlling the operation of said appliances according to said control strategy and further including user-operable controls for entering selective operational information, said master control means being operable for processing said stored and selective operational information into first data packages and for transmitting said first data packages; interface control means operably associated with said appliances including means for receiving said first data packages and selectively energizing and deenergizing said controllable operating components to achieve said appliance operations, said interface control means also including means for transmitting a second data package back to said master control means to verify reception of said first data package and to provide appliance status operational information; and means for effecting communication of said first and second data packages between said master control means and said interface control means, said master control means operable for receiving said second data packages and reprocessing said stored, selective and appliance status operational information into said first data packages, said master control means being operable to effect a repeating sequence of transmitting said first data packages and receiving said second data packages, said interface control means being operable to effect a repeating sequence of receiving said first data packages and transmitting said second data packages, said interface control means and said master control means being operable for interrupting operation of said appliances responsive to the absence of transmission and receipt of either said first or second data packages.

4,703,307

SYNCHRO/RESOLVER SHAFT ANGLE CONVERTER APPARATUS

Robert James, Bloomfield, and Jacob H. Malka, Fair Lawn, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Feb. 5, 1986, Ser. No. 826,403
Int. Cl.[4] H03M *1/64*
U.S. Cl. 340—347 SY **12 Claims**



1. Synchro/resolver shaft angle converter apparatus characterized by:

logic means for providing digital signals and for providing a first control signal, a second control signal and a third control signal;

digital to synchro/resolver converter means connected to the logic means and receiving digital signals therefrom corresponding to predetermined synchro/resolver shaft angles, and responsive to the first control signal from the logic means for converting the digital signals to analog signals, said digital signals being in one format of an analog synchro shaft angle format and an analog resolver shaft angle format in response to the second control signal from the logic means;

means connected to the logic means and receiving other digital signals therefrom, and receiving an external reference signal, and controlled by the first control signal and

the third control signal from the logic means and responsive to the other digital signals and the external reference signal for providing reference signals having a variable amplitude and phase; and

the digital to synchro/resolver converter means connected to the means for providing reference signals having a variable amplitude and phase, and receiving reference signals therefrom as carrier signals for the analog signals.

4,703,308

APPARATUS AND METHODS FOR DIGITAL-TO-ANALOGUE CONVERSION

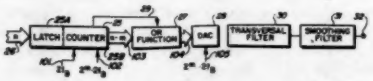
R. Allan Belcher, Swansea, United Kingdom, assignor to Burr-Brown Corporation, Tucson, Ariz.

Division of Ser. No. 633,092, Jul. 23, 1984, Pat. No. 4,621,254, which is a continuation-in-part of Ser. No. 630,977, Jul. 16, 1984, abandoned. This application Jul. 30, 1986, Ser. No. 891,785

Claims priority, application United Kingdom, Jul. 29, 1983, 8320534

Int. Cl.⁴ H03M *1/66*

U.S. Cl. 340—347 DA **10 Claims**



1. A digital-to-analog conversion device comprising in combination:

(a) means for holding values of an n-bit digital signal to be converted one at a time, successive values of the n-bit digital signal being substituted at a first frequency;

(b) means for combining an output signal of the holding means with an interpolation signal that is periodic at a second frequency which is 2^m times the first frequency, the combining means including an n-bit counter producing an n−m bit output signal, and means for setting the counter to the current value of the n-bit digital signal at the first frequency and means for incrementing or decrementing the counter at the second frequency during each period of the first frequency so that there are 2^m times more values of the n−m bit output signal than of the n-bit digital signal; and

(c) an n−m bit digital-to-analog converter coupled to the n−m bit output signal and operating in response to a control signal that is periodic at the second frequency to convert each of the values of the n−m bit output signal to a corresponding analog value to produce an analog output signal having 2^m analog values for each value of the n-bit digital signal.

4,703,309

PRECISION OPTOELECTRONIC ROTATIONAL POSITION SENSOR

David A. Krohn, Hamden, Conn., assignor to Eotec Corporation, West Haven, Conn.

Continuation-in-part of Ser. No. 647,031, Sep. 4, 1984, Pat. No. 4,679,029. This application Jul. 21, 1986, Ser. No. 889,300

Int. Cl.⁴ G08C *9/06*

U.S. Cl. 340—347 P **12 Claims**

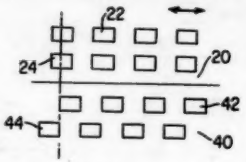
1. An apparatus for determining the rotational position of a shaft comprising:

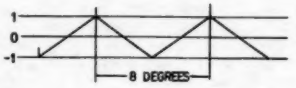
opposed first and second substantially flat members mounted for relative rotation about a predefined axis, one of said members being mounted to said shaft for rotation therewith, the other of said members being maintained in a reference position;

first and second generally circular arrays of spaced apertures on each of said members, the first and second arrays lying in concentric paths of different radial distance from said axis, the first arrays being at the same radial distance from said axis on different ones of said members and the second arrays being at the same radial distance from said axis on different ones of said members, said apertures being positioned so that apertures of said first arrays move into overlapping alignment while apertures of said second arrays move out of overlapping alignment as said first member is rotated relative to said second member;

means for providing a first beam of light of predetermined intensity, the beam of light being oriented so as to intersect the paths of said first rows of apertures;

means for providing a second beam of light of predetermined intensity, the beam of light being oriented so as to intersect the paths of said second rows of apertures;





first and second photosensors coupled to be aligned, respectively, with said first and second beams of light, each photosensor being positioned so that said first and second members are intermediate each light providing means and the respective photosensor, each photosensor providing an electrical output signal related to the intensity of light sensed thereby; and

means differentially responsive to the output signals of said first and second photosensors for providing an orientation signal related to the difference in the intensity of light sensed by said first and second photosensors, said orientation signals being representative of the relative rotational position of said first and second members over a range comparable to the angular extent of one of said apertures.

4,703,310

DIGITAL/ANALOG CONVERTER WITH CAPACITOR-FREE ELIMINATION OF A.C. COMPONENTS

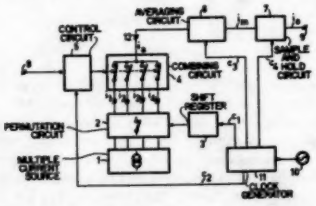
Rudy J. van de Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 8, 1981, Ser. No. 271,315

Claims priority, application Netherlands, Jul. 9, 1980, 8003948

Int. Cl.⁴ H03M *1/66*

U.S. Cl. 340—347 DA **8 Claims**



1. A digital-to-analog converter comprising:

a current-source circuit for generating a plurality of substantially equal currents,

a permutation circuit coupled to the current-source circuit for switching said currents to outputs of said permutation circuit in accordance with a cyclic permutation so as to produce at said outputs a plurality of currents having DC components in an accurately defined mutual relationship to one another and with an AC error component determined by an inequality in the currents generated by the current-source circuit,

an input for receiving a digital input signal,

a combining circuit coupled to said input and to said permutation circuit for deriving, as a function of the digital input signal, an analog output signal from the currents available at the outputs of the permutation circuit,

an output terminal coupled to the combining circuit to derive said analog output signal,

an averaging circuit coupled to the output terminal for averaging the output signal of the combining circuit over an averaging period,

a sampling circuit for sampling the output signal of said averaging circuit at the end of every averaging period, and

a synchronizing circuit for synchronizing the averaging circuit and the permutation circuit so that said averaging period corresponds to the cycle duration of the permutation circuit or an integral multiple thereof, and for synchronizing the combining circuit and the averaging circuit so that the setting of the combining circuit is unchanged during an averaging period.

4,703,311

METHOD AND APPARATUS FOR TRANSFERRING AN INFORMATION CODE ONTO THE SYNCHRONIZATION TRACK OF A VIDEO TAPE AND A VIDEO TAPE PRODUCED ACCORDING TO SAID METHOD

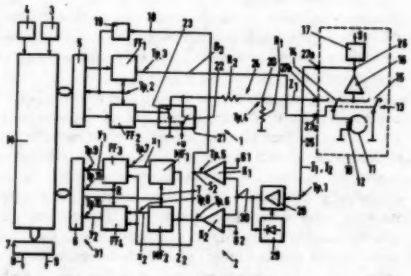
Peter Roggendorf, Mainz-Kostheim, Fed. Rep. of Germany, assignor to GSE Electronic Systems, Inc., Salt Lake City, Utah

Filed Jan. 16, 1987, Ser. No. 3,932

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1986, 3619359

Int. Cl.[4] H03K *13/24*; G11B *27/02*

U.S. Cl. 340—347 DD **22 Claims**



1. A method for applying an information code onto a video recording synchronization track employing synch pulses recorded on said track at regular intervals, comprising the step of:

recording code pulses on the synchronization track without prior erasure of synch pulses, wherein the code pulses are longer than the synch pulses but shorter than the intervals between successive synch pulses and wherein the durations of the code pulses represent binary values.

4,703,312

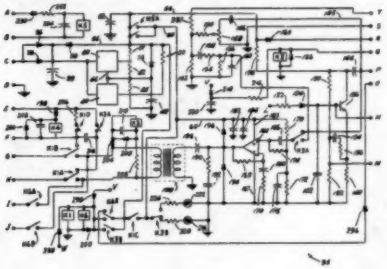
VOICE-OVERRIDE ALARM SYSTEM

Robert W. Berry, III, Bridgeport, Conn., assignor to Audiosone, Inc., Monroe, Conn.

Filed Aug. 22, 1986, Ser. No. 899,153

Int. Cl.[4] G08B *29/00*

U.S. Cl. 340—506 **10 Claims**



1. In an emergency alarm system having a speaker, a blocking capacitor connected in series with the speaker, and a fire alarm control panel including a pair of sensing terminals thereon, circuit-failure indicating means comprising in combination:

(a) a d. c. conducting shunt connected in parallel with the speaker and series blocking capacitor,

(b) electrical switching means,

(c) an electro-responsive actuator device for operating said switching means,

(d) a signal generator connected to said electro-responsive device to energize the same and normally maintain said electrical switching means in closed-circuit condition,

(e) an electrically conducting loop circuit connected with the sensing terminals of the fire alarm control panel, said loop circuit comprising two speaker lines for connection respectively with said speaker and series connected blocking capacitor paralleled by said d. c. conducting shunt,

(f) said switching means being connected in series in said loop circuit whereby failure of the signal generator to function will result in the switching means becoming open-circuited, thereby to break the continuity of the loop circuit,

(g) breakage of either speaker line of said loop circuit or opening-circuiting of said switching means activating the sensing device of the fire alarm control panel to indicate a trouble condition.

4,703,313

PICKET BARRIER AND INTRUSION SENSING SYSTEM

Robert J. Husmann, Soquel, and Lawrence R. Healy, Jr., Los Altos Hills, both of Calif., assignors to Omni Signal, Inc., Capitola, Calif.

Filed Aug. 19, 1985, Ser. No. 767,174

Int. Cl.[4] G08B *13/00*

U.S. Cl. 340—550 **10 Claims**

1. A picket barrier and intrusion sensing system, comprising:

a plurality of elongated generally tubular picket elements disposed in spaced apart relationship to form a barrier, each picket element having a straight portion the walls of which form a sensor receiving chamber extending along a substantial part of its length;

connecting rail means connecting said picket elements together and forming a conduit for containing a signal communicative cable means coupled to an alarm system, and

sensor means disposed within the sensor receiving chambers of at least some of said picket elements, said sensor means being communicatively coupled to said cable means and

operative to detect a predetermined displacement of at least a part of one or more of said picket elements and to communicate a corresponding detection signal to said cable means, said sensor means each including spaced apart electrically conductive electrodes which will be caused to contact each other in the event that said straight portion of the associated picket element is bowed more than a predetermined degree from its rest configuration, each said sensor means being comprised of,

an elongated tubular member having a conductive means disposed along at least a portion of its interior walls and forming one of said conductive electrodes,

an elongated conductive member forming another of said conductive electrodes disposed along the longitudinal axis of said tubular member, and

a pair of electrically conductive wires each having one end thereof connected to one of said conductive electrodes, wherein said contact causes said detection signal to be developed and said sensor means further includes means for detecting the severing of a picket and for likewise causing said detection signal to be developed, said detection signal being thereafter communicated to said alarm system via said cable means.

4,703,314

EMPTY CONTAINER DETECTOR WITH DROP SENSOR

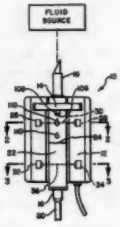
Wayne M. Spani, San Diego, Calif., assignor to Fisher Scientific Group, Inc., La Jolla, Calif.

Continuation of Ser. No. 834,698, Feb. 27, 1986, Pat. No. 4,665,391

This application Dec. 4, 1986, Ser. No. 938,029

Int. Cl.[4] G01F *23/28*

U.S. Cl. 340—619 **16 Claims**



1. A fluid level detector with associated drop counter for use with a transparent container which comprises:

a first photoelectric transducer associated with said container having its light path aimed through said container for operating in a first state when said light path is refracted by a fluid in said container and operating in a second state when said light path is unrefracted by a fluid;

a second photoelectric transducer associated with said container having its light path aimed through said container to generate a signal for providing a normalized input to said first photoelectric transducer corresponding to no fluid in said container;

means connected to said second photoelectric transducer to count interruptions of the light path of said second photoelectric transducer; and

an alarm associated with said second photoelectric transducer to indicate an empty container when said second state is equivalent to a no fluid condition as established by said normalized input.

4,703,315

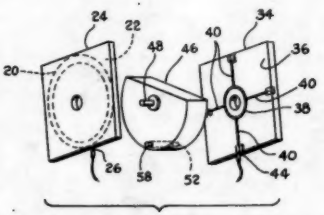
LEVEL INDICATING DEVICE

David H. Bein, and Raymond E. Bein, both of 1841 Beechwood Rd., #7, Charleston, S.C. 29407

Filed Feb. 18, 1986, Ser. No. 829,964

Int. Cl.[4] G01C *9/06*

U.S. Cl. 340—689 **8 Claims**



1. A device for indicating to a remote interested party, when the device attains a predetermined orientation relative to the direction of the force of gravity on the device, comprising:

a housing having at least one planar surface thereon;

a source of electrical power received within said housing;

a first, electrically conductive member received within said housing and in electrical communication with said source of power;

a second member received within said housing in spaced apart relation to said first member, said second member having an electrically conductive surface on predetermined portions only;

a pendulum disposed between said first and second members, said pendulum having electrical contact means on opposite sides of same with electrical connections therebetween, said electrical contact means on one side of said pendulum making continuous electrical contact with said first electrically conductive member;

electrical signal means associated with said source of electrical power, said first member and one of said electrically conductive surface portions of said second member;

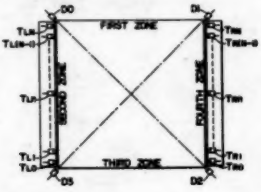
said electrical contact means on said opposite side of said pendulum electrically communicating with one of said electrically conductive surface portions of said second member only when said housing is disposed to cause gravitational forces acting on said pendulum to locate said opposite side contact means at said predetermined electrically conducting surface portion of said second member; and

whereby when said housing is disposed to cause gravitational forces on said pendulum to locate said opposite side contact means of said pendulum at one of said electrically conductive surface portions of said second member, said electrical signal means, said source of electrical power, said first member, said electrical contact means of said pendulum, and said electrically conductive surface of said second member are electrically connected to activate said signal means.

4,703,316
TOUCH PANEL INPUT APPARATUS

Terry G. Sherbeck, Hillsboro, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 18, 1984, Ser. No. 662,319
Int. Cl.[4] G09G 1/16
U.S. Cl. 340—706 7 Claims



1. A touch panel input apparatus disposed adjacent to the surface of a generally rectangular display area, comprising:

only two linear arrays of light detecting means, each array placed along an opposite side of the display area;

four light emitting means, each placed adjacent a corner of the display area and when energized illuminating the linear array of light detecting means on the opposite side of the display area in such a manner that four detection zones are provided, each detection zone being defined by illumination from only two light-emitting means;

driving means for sequentially activating selectable pairs of light emitting means and light detecting means to scan the surface of the display area;

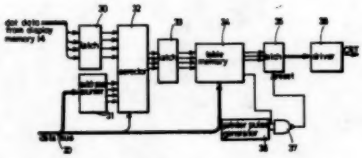
position encoding means responsive to the outputs of the light detecting means for detecting an interruption of light from said light emitting means and encoding data representing the activated pair of light emitting means and light detecting means for which an interruption is detected; and

means responsive to the encoded data for providing the interrupted X-Y position by mathematical calculation.

4,703,317
BLINKING OF A SPECIFIC GRAPH IN A GRAPHIC DISPLAY

Masuo Shiomi, and Takashi Aramaki, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 20, 1983, Ser. No. 563,509
Claims priority, application Japan, May 9, 1983, 58-82285
Int. Cl.[4] G09G 1/16
U.S. Cl. 340—723 1 Claim



1. A device for blinking a specific graph in a graphic display produced with a raster scan of a cathode ray tube, comprising:

memory means for storing a plurality of dot display patterns, said memory means including a plurality of memory units with each one of said plurality of dot display patterns being stored in a corresponding one of said plurality of memory units;

graphic display controller means, connected to said memory means, for reading display signals corresponding to said plurality of dot display patterns into and out of said memory means;

logic table circuit means, connected to said memory means, for developing a picture signal and a blinking display signal from said display signals read out of said memory means by said graphic display controller, said logic table circuit means including,

data address means, responsive to said display signals read out of said memory means, for developing an address signal synchronous with the raster scan of the CRT, said address signal being a compilation of at least one bit from selected ones of said plurality of dot display patterns in selected ones of said memory units said at least one bit corresponding to display data at a position corresponding to a position scanned in the raster scan of the CRT,

table memory means for storing, at addresses that correspond to said address signals, display signal characteristic data, said display signal characteristic data including a plurality of color indicating data and a plurality of blinking characteristic data of respective compilations of at least one bit of selected ones of said dot display patterns,

controller means, responsive to said data address means, for accessing said table memory means to produce an output control signal, and

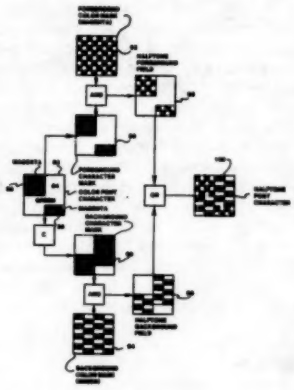
blinking means, responsive to said output control signal for producing said blinking display signal in accordance with said plurality of blinking characteristic data; and

driver means responsive to said picture signal and said blinking display signal, for driving the CRT to produce a graphic display on the CRT and enable designated positions of said graphic display to blink in accordance with said blinking display signal.

4,703,318
CHARACTER-BASED MONOCHROMATIC REPRESENTATION OF COLOR IMAGES

William T. Haggerty, Groton, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Continuation-in-part of Ser. No. 595,027, Mar. 30, 1984. This application Apr. 16, 1985, Ser. No. 723,732
Int. Cl.[4] G09G 1/00
U.S. Cl. 346—723 16 Claims



1. A method of forming a monochromatic image from a digital representation of a color image, said monochromatic image being formed on a character-based output device having a loadable font memory for storing a library of up to a predetermined maximum number of font patterns, comprising the steps of:

forming a character-based representation of said color image in which a plurality of color characters each describe the background and foreground color within a defined area of said color image,

providing a plurality of color pattern masks each corresponding to a color in said color image and comprised of a pattern of light and dark dots capable of providing, in the monochromatic image, visual discrimination between areas of different color,

transforming said color characters to monochromatic characters by replacing the background and foreground colors of each said color character with the corresponding pattern of light and dark dots, said transforming including defining and loading, as required by the formation of the particular monochromatic image, at least some of the font patterns in the font memory, and

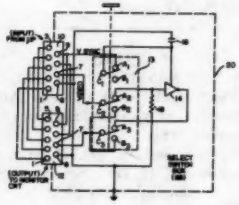
displaying said monochromatic characters on said character-based output device.

4,703,319

SELECT SWITCH BOX FOR WHITE ON BLACK AND BLACK ON WHITE CRT DATA DISPLAY

Jonathan M. Schine, Los Angeles, Calif., assignor to High Resolution Sciences, Inc, Los Angeles, Calif.

Filed Sep. 6, 1985, Ser. No. 773,336
Int. Cl.[4] G09G *1/14*
U.S. Cl. 340—723 **3 Claims**



1. A selector switch box for selecting display of data on a CRT monitor utilizing at least a vertical synch signal and a video signal generated by a microprocessor to be white on a dark background or dark on a white background, comprising

an input connector to be connected to the microprocessor and an output connector to be connected to the CRT monitor, said connector having matching pins connected together directly including two pins for providing a common ground for said microprocessor and said CRT monitor, said matching pins including two pins for except one pin of the input connector for the video signal and one pin of the output connector for the video signal,

a three-pole double-throw switch having three pairs of contacts A_1, B_1; A_2, B_2; and A_3, B_3 and moving contacts C_1, C_2 and C_3 for selectively making contact with either one of respective contacts A_1, A_2 and A_3, and B_1, B_2 and B_3,

an electrical connection between contact A_1 and a pin of said connectors through which said vertical sync signal is transmitted by said microprocessor to said CRT monitor,

an electrical connection between contact A_2 and a pin of said connectors through which said video signal is transmitted by said microprocessor to said CRT monitor,

an electrical connection between contact B_2 and contact B_3, and

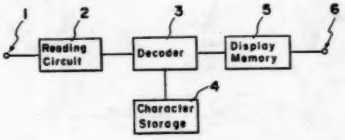
an inverter having its input terminal connected to contact A_2, its output terminal connected to contact A_3, its power input terminal connected to moving contact C_1, and its ground terminal connected to one of said connector pins connected directly to provide a common ground for the microprocessor and the CRT monitor.

4,703,320

CHARACTER PATTERN STORAGE AND DISPLAY DEVICE

Keisuke Okano, Tsuzuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 20, 1984, Ser. No. 642,598
Claims priority, application Japan, Aug. 24, 1983, 58-155181
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—731 **1 Claim**



1. A character pattern storage and display device which comprises:

a storing means for storing character data including a character bit pattern descriptive of a character, shift information representative of a vertical shift to be effected to said character bit pattern, width information representative of a spacing with respect to a neighboring character bit pattern, and position information representative of start position of display of said character bit pattern, said shift information, width information and position information being stored in a predetermined format within said character data;

a designating means for designating and producing said charater data from said storing means;

a reading means for reading and separating said shift information, said width information and said position information from said produced character data;

a shift control means for controlling the vertical shift to be effected to said character bit pattern, in accordance with said shift information;

a width control means for controlling the spacing with respect to a neighboring character bit pattern, in accordance with said width information;

a position control means for controlling the start position of display of said character bit pattern, in accordance with said position information; and

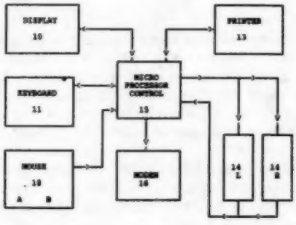
an output means for outputting said character bit pattern to be displayed.

4,703,321

METHOD FOR EDITING A GRAPHIC OBJECT IN AN INTERACTIVE DRAW GRAPHIC SYSTEM

Barbara A. Barker, Round Rock, and Irene H. Hernandez, Austin, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 30, 1985, Ser. No. 781,621
Int. Cl.[4] G09G *1/14*
U.S. Cl. 340—747 **7 Claims**



1. A method for editing a sub-object of a graphic object displayed in an interactive draw graphic system in which said

object has at least one pair of selectable segment sub-objects which are interconnected at a common point, said method including the steps of

(a) selecting either a first editing mode in which a graphical editing action on said sub-object causes said object to be redefined in accordance with the movement of said sub-object or a second editing mode in which said graphical editing action on said sub-object affects only said sub-object, and

(b) graphically editing said sub-object.

4,703,322

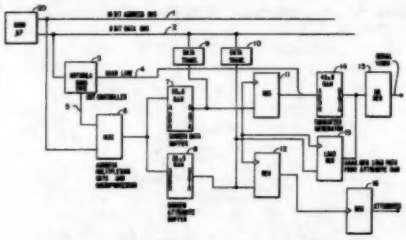
VARIABLE LOADABLE CHARACTER GENERATOR

Gary J. Goss, Acton; Thomas O. Holtey, Newton, both of Mass., and James C. Siwik, Nashua, N.H., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Continuation of Ser. No. 873,835, Jun. 9, 1986, abandoned, which is a continuation of Ser. No. 504,092, Jun. 13, 1983, abandoned. This application Jan. 5, 1987, Ser. No. 946,663

Int. Cl.[4] G09G *1/16*

U.S. Cl. 340—750 **2 Claims**



1. A programmable character generator arrangement used with raster scan display apparatus to display characters thereon, said character generator arrangement comprising:

a screen data buffer in which is normally stored character codes representing characters that are to be displayed on said display apparatus, the characters codes in said screen data buffer being read out serially in synchronization with the raster scan of said display apparatus;

a character generator in which is stored first display information and which is addressed using said character codes serially read out of said screen data buffer, said character generator generating a first display signal that when input to said display apparatus displays thereon the characters represented by said character codes;

a screen attribute buffer in which is normally stored attribute codes representing display modifications that are to be made to characters to be displayed on said display apparatus, said attribute codes being read out of said screen attribute buffer serially in synchronization with the raster scan of said display apparatus and being input thereto, said display apparatus responding to said attribute codes to modify the display of said characters;

multiplex means operable when it is desired to reprogram said character generator with second display information that will cause different characters to be displayed when addressed using said character codes, for loading addresses for said character generator into said screen data buffer rather than character codes, and said second display information into said screen attribute buffer rather than attribute codes; and

means for transferring said second display information stored in said screen attribute buffer into said character generator at addresses stored in said screen data buffer, and

thereafter character codes stored in said screen data buffer are again serially read out therefrom and used to address said character generator to read out said second display information that when input to said display apparatus causes the display of said different characters.

4,703,323

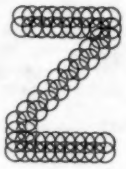
METHOD AND APPARATUS FOR DISPLAYING ENHANCED DOT MATRIX CHARACTERS

Demetrios Troupes, and Randall W. Alexander, both of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 695,997, Jan. 29, 1985, Pat. No. 4,586,835, which is a continuation-in-part of Ser. No. 602,248, Apr. 20, 1984, abandoned. This application Jul. 3, 1985, Ser. No. 752,165

Int. Cl.[4] G09G *3/00*

U.S. Cl. 340—790 **17 Claims**



1. A method of displaying enhanced dot matrix characters comprised of selected binary data elements representing either a dot or a blank in a matrix of positions arranged in horizontal row and vertical columns, the method comprising:

(a) storing sets of binary data elements, each set defining a respective character having horizontal linear components of a higher density and vertical and diagonal linear components of a lower density;

(b) performing logical operations on a set of the stored binary data elements to generate associated additional binary data elements which selectively enhance the respective character; and

(c) selectively using at least some of the generated associated additional binary data elements together with the stored binary data elements to display characters in which at least one of the vertical, diagonal and horizontal linear components thereof are enhanced along the length thereof.

4,703,324

SYSTEM IDENTIFICATION IN COMMUNICATIONS SYSTEM

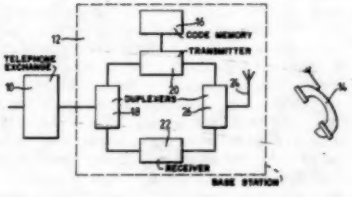
Philip D. White, Chessington, England, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 539,585, Oct. 6, 1983, abandoned. This application Dec. 8, 1986, Ser. No. 940,215

Claims priority, application United Kingdom, Oct. 8, 1982, 8228886

Int. Cl.[4] H04Q *7/00*; H04B *7/00*

U.S. Cl. 340—825.14 **3 Claims**



1. A method by which a radio receiver may indentify the

base station related thereto in a radio communication system which shares a signaling channel with the base station of at least one other communications system, such method comprising: transmission by each base station of synchronizing signal bursts at time intervals determined in accordance with a predetermined sequence which is different for each base station, each signal burst including an indication of the time interval between transmission thereof and a succeeding signal burst to be transmitted by such base station; reception of such signal bursts by said receiver; comparison in said receiver of the time intervals between reception of sequential signal bursts with a predetermined sequence of time intervals internally stored therein; and synchronization of said receiver with its related base station by matching the time intervals between reception of such sequential signal bursts with the predetermined sequence of time intervals internally stored in said receiver.

4,703,325

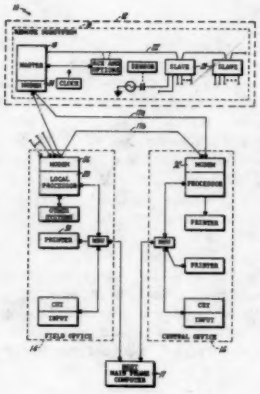
REMOTE SUBSYSTEM

Frederick C. Chamberlin, Syracuse, N.Y.; Charles Whynacht, Glastonbury, Conn.; Peter D. Carter, Tolland, Conn., and Charles S. Wilson, Newington, Conn., assignors to Carrier Corp., Syracuse, N.Y.

Filed Oct. 22, 1984, Ser. No. 663,622

Int. Cl.[4] G08B *23/00*; G05B *23/02*

U.S. Cl. 340—825.17 **22 Claims**



1. A remote subsystem for monitoring the status and performance of at least one unit of equipment at a remote site by periodically monitoring the states of a plurality of discrete parameter signals, associated with each unit of equipment, each related parameter signal being indicative of a like plurality of unit status parameters, said remote subsystem transmitting periodic messages indicative of the equipment status and performance to at least one related office, comprising:

signal processor means, responsive to the discrete parameter signals and having memory means for storing signals indicative of a previously monitored state of each periodically monitored discrete parameter signal, wherein selected discrete signals each having normal and abnormal states indicative of normal and abnormal conditions, respectively, are related in alarm groups, each group corresponding to a particular unit of equipment, said signal processor means comparing the presently monitored state of each discrete signal with a previously stored state of that signal for detecting a state change therebetween, said signal processor providing an alarm status signal for only the first discrete signal in an alarm group of related discrete signals to change state from a normal state to an abnormal state, said alarm signal being indicative of an associated abnormal condition in said corresponding unit of equipment, said signal processor providing a return to normal signal upon detecting a change in said first discrete signal from the abnormal state to the normal state only if all said discrete alarm signals in said related alarm group are presently in the normal state; and

communication element means, responsive to said alarm signal and said return to normal signal for transmission thereof to a related office.

4,703,326

METHOD AND APPARATUS FOR MEASURING PRESSURES IN A ROTOR OF A TURBOMACHINE

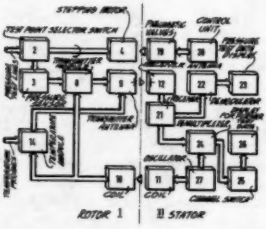
Kurt Ding, Augsburg; Helmut Brandt, Munich, and Josef Wenzl, Herbertshausen, all of Fed. Rep. of Germany, assignors to MTU Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 23, 1986, Ser. No. 821,695

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1985, 3502278.7

Int. Cl.[4] G01D *7/00, 7/02, 7/04*

U.S. Cl. 340—870.16 **24 Claims**



1. Apparatus for measuring pressures in a gas turbine engine comprising a stator, a rotatable shaft, a rotor on said shaft, first sensor means including a plurality of inputs measuring pressure at respective test points, said shaft being tubular and including therein in coaxial arrangement for rotation with said shaft:

selector switch means for selection of signals from respective test points,

stepping motor means for driving the selector switch means stepwise for selective connection with the respective test points,

a retaining and connecting component for said selector switch means,

pressure sensor means connected to said switch means for receiving the pressure from the respective test point,

further sensor means for measuring further conditions in the engine apart from pressure,

first transmitter means for the telemetric remote transmission of the pressure signals from the pressure sensor means,

second transmitter means for the telemetric remote transmission of signals representing the further conditions,

a support carrier for said first and second transmitter means,

a transmitter antenna connected to said first and second transmitter means,

current supply means connected to said first and second transmitter means,

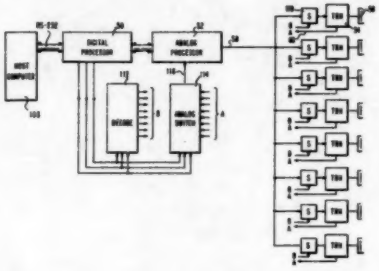
said first and second transmitter means transmitting the pressure and the further condition signals as test data to said stator via said transmitter antenna as frequency modulated RF signals.

4,703,327

INTERROGATOR/RECEIVER SYSTEM FOR USE WITH A REMOTE TRANSPONDER

Anthony J. Rossetti, San Jose, and Paul A. Nysen, Sunnyvale, both of Calif., assignors to X-Cyte, Inc., Mountain View, Calif.

Filed Oct. 31, 1985, Ser. No. 793,704
Int. Cl.[4] G01S 13/74
U.S. Cl. 342—44 16 Claims



1. Interrogator/receiver apparatus for transmitting a first signal to, and receiving a second signal from a remote transponder of the type having (1) a plurality of signal conditioning means coupled to receive said fist signal, each signal conditioning means providing an intermediate signal having a known delay and a known amplitude modification to said first signal, and (2) signal combining means coupled to all of said signal conditioning means, for combining said intermediate signals to produce said second signal, said signal conditioning means and said signal combining means imparting a known informational code to said second signal, said interrogator/receiver apparatus comprising:

(a) a common means for generating said first signal, said first signal being of radio frequency (RF); and

(b) a plurality of transimitter/receiver means, each being remote from, and coupled to said common RF signal generating means, for transmitting said first signal to, and receiving said second signal from a transponder, each transmitter/receiver means including means for mixing said first signal with said second signal, thereby to produce a detected third signal at said remote location containing said informational code from said transponder.

4,703,328

WINDOW ANTENNA/HEATER ARRANGEMENT

David W. Jones, Southport, and Malcolm Elston, Bury, both of United Kingdom, assignors to Pilkington plc, Merseyside and Salford Electrical Instruments, Limited, Lancashire, both of, England

Filed Jan. 25, 1985, Ser. No. 694,784
Claims priority, application United Kingdom, Jan. 27, 1984, 8402244
Int. Cl.[4] H01Q 1/02
U.S. Cl. 343—704 11 Claims

1. A glass window for a vehicle in combination with a heater/antenna arrangement which is supplied with heating current through a decoupling circuit that is operable to decouple the heating current supply from a radio signal that is derived from the heater/antenna arrangement and is fed through the decoupling circuit to an aerial input for a radio receiver of the vehicle, the heater/antenna arrangement comprising:

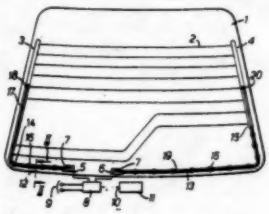
a pair of bus bars disposed at spaced locations on the window;

electrical resistance heating means extending between said spaced pair of bus bars;

a pair of terminals located on the window between said spaced bus bars and arranged near to the periphery of the window for connection to said decoupling circuit, said terminals being spaced from 50 mm to 300 mm apart;

a first low electrical resistance lead which is electrically connected to one of said terminals and to at least one point on one of said bus bars spaced from the ends of that bus bar; and

a second low electrical resistance lead which is electrically connected to the other of said terminals and to at least one point on the other of said bus bars spaced from the ends of that bus bar;



said low electrical resistance leads being operable to carry both heating current from said terminals and a radio signal to said terminals, and being fixed to the surface of the window and positioned to provide low electrical resistance conductive paths on said window from said terminals to said bus bars, said paths being sufficiently spaced from the window edge to reduce any stray capacitance to a level such that a usable radio signal can be derived at said terminals for feeding through said decoupling circuit to said aerial input.

4,703,329

METHOD AND APPARATUS FOR CONTROLLING SHEET MATERIAL IN AN INK JET PRINTER

David Allen, and Calvin Winey, both of Chelmsford, Mass., assignors to Advanced Color Technology, Inc., Cambridge, Mass.

Filed May 9, 1986, Ser. No. 861,591
Int. Cl.[4] H04N 1/22; G03G 15/00
U.S. Cl. 346—24 11 Claims

1. In an ink jet printer of the type having

an imaging drum,

a supply of sheet material within said drum, and

imaging means for producing an image on said sheet material while positioned on said drum,

apparatus for controlling the transport of said sheet material comprising

drive means for said sheet material having

a first spatial position in which said drive means is coupled to said drum and transports said sheet material in a first direction, and

a second spatial position in which said drive means is disconnected from said drum,

a cutter mechanism for shearing said sheet material,

and means controlled by said cutter mechanism for moving said drive means between said first and second positions.

4,703,330

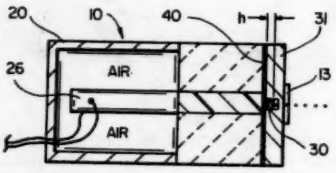
COLOR INK JET DROP GENERATOR USING A SOLID ACOUSTIC CAVITY

Mark A. Culpepper, Santa Clara County, Calif., assignor to Ricoh Co., Ltd., Tokyo, Japan and Ricoh Systems, Inc., San Jose, Calif.

Filed May 5, 1986, Ser. No. 859,480

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—75 **20 Claims**



1. A drop generator for multi-collor printing for breaking up an ink stream synchronously into outwardly propelled droplets in order that the droplets may be charged and deflected for the purpose of printing, comprising

a support frame defining a resonance cavity with first and second openings on the front and rear of the cavity, respectively,

a solid material for filling the cavity comprising means for transmitting acoustical disturbances from the rear to the front opening of the cavity,

a disturbance means mounted within said frame external to the cavity at the second, rear opening to said cavity, said disturbance means being bonded to the solid material filling the cavity,

an ink channel plate positioned within the frame across the face of the front opening of the cavity defining a plurality of ink channels across the front opening of said cavity for simultaneously dispensing a plurality of droplets in response to energization of said acoustic means,

a nozzle plate attached to the ink channel plate defining a plurality of rows of nozzles having one end open to said channel and the other end open to expel said outwardly propelled droplets, one of each of said rows being supplied by one of said channels, and

a means for supplying ink of different colors to each of said channels, said different colored inks being expelled through said nozzles in response to disturbances created by said disturbance means and transmitted by said solid material to said ink channel to expel said ink, whereby multi-color printing of high quality may be achieved.

4,703,331

HIGH SPEED SPARK JET PRINTER

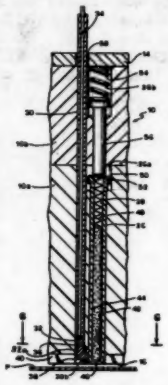
Gerald S. Stevens, Jr., Forest Hill, Md., assignor to General Instrument Corp., New York, N.Y.

Filed Nov. 29, 1985, Ser. No. 802,969

Int. Cl.[4] G01D *15/16*; B41J *3/02*; B32B *3/20*

U.S. Cl. 346—140 R **19 Claims**

1. A stationary head for a spark jet printer adapted to print on paper associated therewith, said head comprising a block of non-conductive material having a surface adapted to be proximate said paper and having a plurality of spark jet capsule receiving openings arranged in rows, said rows extending in a direction substantially transverse to the direction of paper movement, a plurality of electrode receiving openings, each of said electrode receiving openings being proximate a different one of said capsule receiving openings, and channels in the



surface of said block proximate the paper extending between each of said electrode receiving openings and said capsule receiving opening proximate thereto.

4,703,332

INK JET PRINT HEAD AND PRINTER

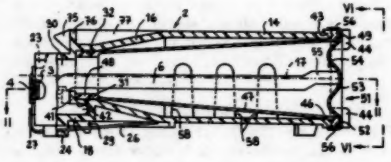
Alessandro Crotti, Strambino, and Roberto R. Luc, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Nov. 5, 1986, Ser. No. 927,227

Claims priority, application Italy, Nov. 14, 1985, 67962 A/85

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **13 Claims**



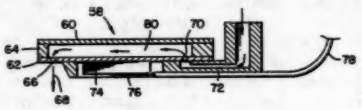
1. An ink jet print head for electrically conductive ink comprising a container (2) for the ink, having a nozzle (4) for the on-demand emission of droplets of ink, an electrode (6) in contact with the ink and a counter-electrode (7) adjacent to the nozzle. The emission being caused by an electrical voltage pulse between the counter-electrode and the electrode such as to cause vaporisation of the ink in a portion of the nozzle, characterised in that the container (2) comprises a rigid frame (14, 16) of insulating material of tapered shape, the nozzle (4) being disposed at one end thereof, a tubular membrane (47) fitted into the frame to contain the ink and having an edge (48) connected sealingly to the frame in the vicinity of said nozzle, and a second edge (49) connected to the opposite end of the frame and locked thereto by a metal plate (51) connected to the electrode (6), the frame being provided on two opposite side surfaces with at least two corresponding openings (58) to permit the membrane to keep the ink at atmospheric pressure during the printing operation.

4,703,333

IMPULSE INK JET PRINT HEAD WITH INCLINED AND STACKED ARRAYS

David W. Hubbard, Stamford, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Jan. 30, 1986, Ser. No. 823,904
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R 18 Claims



1. An array for an impulse ink jet print head of the type in which a plurality of plates are held together in a superposed relationship comprising:

a base plate;

a diaphragm plate having a nozzle for ejecting ink droplets therethrough and a restrictor orifice, said nozzle and said restrictor orifice having axes extending transversely through said diaphragm plate at spaced apart locations;

a chamber plate mounted in contiguous relationship intermediate said base plate and said diaphragm plate including continuously extending sidewall defining a chamber extending therethrough;

an ink supply in communication with said restictor orifice for supplying ink through said restrictor orifice into the chamber; and

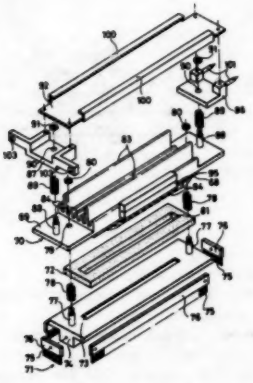
driver means mounted on said diaphragm plate operable to deflect said diaphragm plate to displace ink in the chamber thereby causing the ejection of ink droplets from said nozzle.

4,703,334

OPTICAL RECORDING HEAD AND BELT POSITIONING APPARATUS

Hidenki Mochimaru, Yokahama; Kazuyuki Shimada, Tokyo, and Junichi Hirasawa, Hiratsuka, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Aug. 24, 1984, Ser. No. 644,493
Claims priority, application Japan, Aug. 26, 1983, 58-156151; Aug. 26, 1983, 58-156154; Sep. 20, 1983, 58-145727[U]; Oct. 28, 1983, 58-202122; Oct. 28, 1983, 58-202123
Int. Cl.[4] G01D *15/14*
U.S. Cl. 346—160 21 Claims



15. An optical recording head for applying light containing image information to an imaging member to form an electrostatic latent image thereon, comprising:

first supporting means for supporting a lens array comprising of a plurality of lenses;

second supporting means for supporting a light-emitting array comprised of a plurality of light-emitting diodes;

first adjusting means for adjusting a distance between said first and second supporting means;

a deformable seal member interposed between said first and second supporting means, said seal member being provided with an opening allowing light emitted from said light-emitting array to pass through said opening to said lens array; and

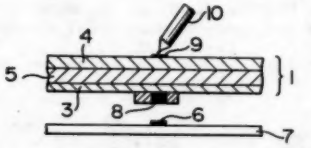
channel means for slidingly engaging the optical recording head into engagement with a stationary object.

4,703,335

HEAT-SENSITIVE AND HEAT-TRANSFERABLE RECORDING SHEET

Toshihiko Matsushita, Tokyo; Sadao Morishita, Ibaraki, and Mikiya Sekine, Warabi, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jan. 21, 1986, Ser. No. 820,305
Claims priority, application Japan, Jan. 21, 1985, 60-9695; Jun. 27, 1985, 60-98901
Int. Cl.[4] B41M *5/18*
U.S. Cl. 503—204 10 Claims



1. A heat-sensitive and heat transferable recording sheet comprising a substrate, a heat-sensitive, color-forming layer provided on the front side of said substrate and a heat-transferable layer provided on the back side of said substrate, wherein the heat-transferable layer is composed essentially of an electron-donating colorless dye, an electon-accepting compound, a low-melting substance and a desensitizer which is a surfactant selected from the group consisting of anionic surfactants, cationic surfactants, nonionic surfactants and ampholytic surfactants, the amount of desensitizer being 0.05 to 5% by weight based on the total solid of the heat-transferable layer, the amount of the low-melting substance being 25% to 75% by weight based on the total solid of the heat-transferable layer.

4,703,336

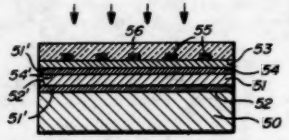
PHOTODETECTION AND CURRENT CONTROL DEVICES

Stanford R. Ovshinsky, Bloomfield Hills, and Arun Madan, Birmingham, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation of Ser. No. 710,359, Apr. 18, 1985, which is a continuation of Ser. No. 540,153, Oct. 7, 1983, Pat. No. 4,529,380, which is a continuation of Ser. No. 427,688, Sep. 29, 1982, Pat. No. 4,409,605, which is a continuation of Ser. No. 222,489, Jan. 5, 1981, abandoned, which is a continuation-in-part of Ser. No. 104,284, Dec. 17, 1979, abandoned, which is a division of Ser. No. 887,353, Mar. 16, 1978, Pat. No. 4,226,898.
This application Apr. 17, 1986, Ser. No. 853,264
The portion of the term of this patent subsequent to Oct. 11, 2000, has been disclaimed.
Int. Cl.[4] H01L *27/14, 45/80*
U.S. Cl. 357—30 20 Claims

1. A photodetection device comprising: means responsive to the intensity of incident radiation for providing a correspond-

ing output signal, said responsive means including a thin semiconductor film comprising a solid amorphous silicon or amorphous germanium host matrix having electronic configurations



with an energy gap; said host matrix of the amorphous semiconductor material further including at least one compensating element for reducing the density of localized states in said energy gap.

4,703,337

SEMICONDUCTOR PHOTOELECTRIC CONVERSION DEVICE, LIGHT-TRANSPARENT SUBSTRATE THEREFOR AND THEIR MANUFACTURING METHODS

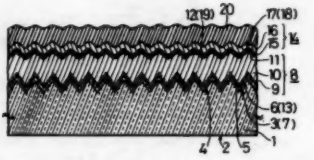
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Filed Jan. 11, 1984, Ser. No. 569,860

Claims priority, application Japan, Jan. 12, 1983, 58-3156

Int. Cl.[4] H01L *27/14, 31/00*

U.S. Cl. 357—30 **20 Claims**



1. A semiconductor photoelectric conversion device comprising:

a light-transparent substrate;

a light-transparent first conductive layer formed on the substrate to serve as an electrode;

a non-single-crystal semiconductor laminate member formed on the first conductive layer and having formed therein at least one junction, the junction being either one of PIN and PN; and

a reflective second conductive layer formed on the non-single-crystal semiconductor laminate member to serve as another electrode;

wherein the boundary between the substrate and the first conductive layer is formed by a first uneven surface including plural surfaces of first convexities the base of which extend along the substrate surface and the two lateral edges of which are inclined thereto and make an angle ϕ to each other, where $45° < \phi < 120°$;

wherein the boundary between the first conductive layer and the non-single-crystal semiconductor laminate member is formed by a second uneven surface corresponding to the first uneven surface;

and wherein the boundary between the non-single-crystal semiconductor laminate member and the reflective second conductive layer is formed by a third uneven surface including plural surfaces of second convexities the side surfaces of which are inclined to the substrate surface.

4,703,338

RESIN COMPOSITION TO SEAL ELECTRONIC DEVICE

Yosuke Sagami, Yokohama; Akira Yamamoto, Yachiyo; Shoji Watanabe, Otake; Tomohisa Isobe, Iwakuni, and Susumu Funato, Otake, all of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 659,997, Oct. 12, 1984, abandoned. This application Jun. 10, 1986, Ser. No. 873,113

Claims priority, application Japan, Oct. 14, 1983, 58-192169; Mar. 22, 1984, 59-55109; Jun. 12, 1984, 59-119220

Int. Cl.[4] H01L *23/28*

U.S. Cl. 357—72 **18 Claims**

1. A resin-sealed electronic device which is an integrated circuit, transistor, thyristor, diode, resistor or capacitor, coated with a cured resin composition for imparting heat resistance or electrical insulating properties thereto, said resin composition having been prepared by curing, with radiation, a composition comprising

(a) an unsaturated, radical-polymerizable, alicyclic ester compound prepared by reacting an alicyclic epoxy compound having at least two epoxy groups in the molecule, with from 0.5 to 1.1 equivalents, per equivalent of said epoxy groups, of acrylic or methacrylic acid, under conditions effective to cause ring opening of said epoxy groups and esterification of the carboxyl groups of said acrylic or methacrylic acid to form an alicyclic ester compound and to prevent substantial polymerization of said alicyclic ester compound.

(b) a radical-polymerizable vinyl monomer having at least one polymerizable vinyl group in the molecule, other than ester (a), and selected from the group consisting of acrylates, methacrylates, styrene, substituted styrenes, n-vinylpyrrolidone, acrylonitrile, vinyl acetate and mixtures thereof, and

(c) a photopolymerization initiator capable of generating free radicals and initiating polymerization of (a) and (b), upon irradiation with ultraviolet radiation,

the weight ratio of (a)/(b) being in the range of 40/60 to 95/5.

4,703,339

PACKAGE HAVING A HEAT SINK SUITABLE FOR A CERAMIC SUBSTRATE

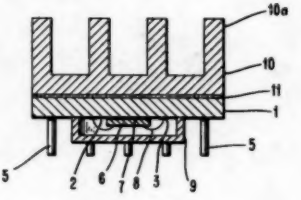
Youichi Matsuo, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 17, 1986, Ser. No. 875,058

Claims priority, application Japan, Jul. 8, 1985, 60-148216

Int. Cl.[4] H01L *23/36*; C22C *21/02*

U.S. Cl. 357—81 **6 Claims**



1. A package comprising:

a substrate made of a ceramic material;

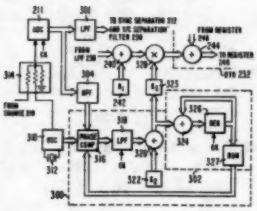
at least one heat generating component mounted on a first surface of said substrate; and

at least one heat sink fixed on a second surface of said substrate opposite said first surface, and made of an aluminum-silicon alloy material, said aluminum-silicon alloy material containing silicon in a weight percentage ranging from 30% through 40%.

4,703,340
FREQUENCY DIVISION MULTIPLEXED ANALOG TO DIGITAL CONVERTER

Alvin R. Balaban, Lebanon; Leopold A. Harwood, Bridgewater; Chandrakant B. Patel, Hopewell, and Walter H. Demmer, Plainsboro, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed May 2, 1986, Ser. No. 858,720
Int. Cl.[4] H04N 5/00
U.S. Cl. 358—19 **7 Claims**



1. Apparatus comprising:

first and second terminals for applying respective first and second input signals occupying respective first and second mutually exclusive predetermined bands of frequencies;

circuitry coupled to said first and second terminals for linearly combining said first and second input signals;

a source of clock signals;

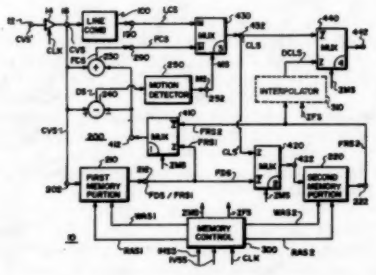
analog-to-digital converting means coupled to said combining means for developing digital samples representing the signals provided by said combining means at instants in time determined by said clock signal; and

filtering means coupled to said analog to digital converting means and responsive to the digital samples provided thereby for developing first and second digital signals occupying mutually exclusive bands of frequencies and representing said first and second input signals, respectively.

4,703,341
TELEVISION HAVING LUMA/CHROMA SEPARATION APPARATUS

Donald H. Willis, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Jan. 12, 1987, Ser. No. 2,320
Int. Cl.[4] H04N 9/78
U.S. Cl. 358—31 **8 Claims**



7. A television apparatus for separating at least one of the luminance and chrominance components from a composite video signal CVS consisting of successive picture frames; said incoming composite video signal including periodic horizontal and vertical synchronizing signals IHSS and IVSS disposed between successive lines and fields or frames of picture information, respectively; said apparatus comprising:

an input port for applying said incoming composite video signal CVS;

a source of zoom mode indicative signal ZMS having a first value when said apparatus is in the normal display mode and a second value when said apparatus is in the zoom processing mode;

a frame memory, coupled to said input port, having a first portion and a second portion; each of said first and second memory portions having an input terminal and an output terminal;

memory control means coupled to said frame memory and responsive to said horizontal and vertical synchronizing signals IHSS and IVSS for generating first and second sets of write and read address signals for controlling the writing and reading operations of said first and second memory portions, respectively—both during the normal display mode and the zoom processing mode;

said first memory portion, responsive to said first set of write and read address signals, storing one frame of the incoming composite video signal representative of the zoomed portion and providing a first frame delayed composite video signal FRS1 at its output terminal in the zoom processing mode;

said frame memory, responsive to said write and read address signals, storing one frame of said incoming composite video signal CVS and providing a second frame delayed composite video signal FRS2 in the normal display mode;

means for combining said incoming composite video signal CVS with the respective one of said frame delayed composite video signals FRS1 and FRS2 to produce a frame combed video signal FCS representative of the frame combed version of said separated component;

first switching means having an output terminal coupled to said combining means and further having a pair of input terminals coupled for receiving the respective one of said first and second frame delayed composite video signals FRS1 and FRS2; said first switching means, responsive to said zoom mode indicative signal ZMS, selectively coupling to said combining means said first frame delayed composite video signal FRS1 in the zoom processing mode and said second frame delayed composite video signal FRS2 in the normal display mode;

second switching means having an output terminal coupled to said second memory portion and further having an input terminal coupled for receiving said frame combed signal FCS; said second switching means, responsive to said zoom mode indicative signal ZMS, coupling said frame combed signal FCS to said second memory portion in the zoom processing mode; and

said second memory portion, responsive to said second set of write and read address signals, storing said frame combed signal FCS representative of said zoomed portion of said input image, and providing said frame combed signal FCS at its output terminal in the zoom processing mode.

4,703,342
LUMINANCE/CHROMINANCE SEPARATING APPARATUS

Hiroshi Takahashi, Tokyo, Japan, assignor to NEC Corporation, Japan

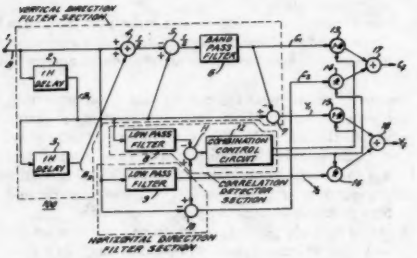
Filed Jan. 13, 1986, Ser. No. 818,552
Claims priority, application Japan, Jan. 14, 1985, 60-4512
Int. Cl.[4] H04N 9/78
U.S. Cl. 358—31 **9 Claims**

1. A luminance/chrominance separating apparatus for a composite video signal comprising:

a vertical direction filter means for extracting a chrominance component and a luminance component from a composite video signal to produce a first chrominance signal and a first luminance signal;

a horizontal direction filter means for extracting a chrominance component and a luminance component from said composite video signal to produce a second chrominance signal and a second luminance signal;

a correlation detecting means for detecting a correlation between lines contained in said composite video signal and



producing a gain control signal in response to such detected correlation; and

a combining means for combining said first and second chrominance signals and for combining said first and second luminance signals in accordance with said gain control signal.

4,703,343

NOISE REDUCTION FEEDBACK TYPE COMB FILTER

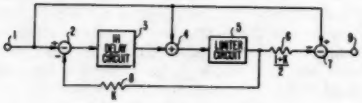
Masahiro Honjo, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

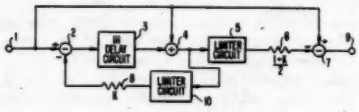
Filed Dec. 18, 1985, Ser. No. 810,689

Claims priority, application Japan, Dec. 25, 1984, 59-277167; Apr. 25, 1985, 60-89216; Apr. 25, 1985, 60-89217

Int. Cl.[4] H04N *5/213*

U.S. Cl. 358—36 **20 Claims**





1. A feedback type comb filter comprising:

a first operational means for operating upon an input signal and a feedback signal;

a delay means for delaying an output signal of said first operational means by a predetermined time to obtain a delayed signal;

a second operational means for operating upon said input signal and said delayed signal to obtain a vertical correlation signal representing a vertical correlation of said input signal;

a limiter means for limiting an amplitude of said vertical correlation signal to obtain an amplitude limited vertical correlation signal;

a first coefficient means for giving a first coefficient K1 to one of said vertical correlation signal and said amplitude limited vertical correction signal to obtain said feedback signal;

a second coefficient means for giving a second coefficient K2 to said amplitude limited vertical correlation signal; and

a third operational means for operating upon said input signal and an output signal of said second coefficient means to obtain an output signal,

wherein said comb filter has a comb filter characteristic when said vertical correlation of said input signal is large and allows said input signal pass as is when said vertical correlation is small.

4,703,344

ILLUMINATION SYSTEM OF THE DIGITAL CONTROL TYPE

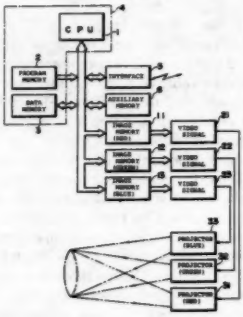
Atushi Hisano; Yoshinori Yamaguchi, both of Nagaokakyo; Toshimichi Masaki, Takatsuki; Kazuhiko Saka, Joyo; Nobuo Nakatsuka, and Mitsutaka Kato, both of Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Mar. 24, 1986, Ser. No. 843,390

Claims priority, application Japan, Mar. 30, 1985, 60-67996; Jun. 28, 1985, 60-99852[U]; Jul. 11, 1985, 60-153770

Int. Cl.[4] H04N *7/18, 9/31*

U.S. Cl. 358—60 **10 Claims**



1. A digital control illumination system comprising:

an image memory for storing data regarding a predetermined illumination pattern;

video signal producing means for reading out the data from said image memory and converting said data to a video signal indicative of the illumination pattern; and

light irradiating means for projecting the light of the illumination pattern represented by said video signal onto an object, said irradiating means including a lens through which said light passes.

4,703,345

CURRENT CONTROL APPARATUS IN WHICH THE BEAM CURRENT FOR ALL THREE COLORS IS CONTROLLED ACCORDING TO AVERAGE AND PEAK VALUES

Atsushi Matsuzaki, and Mitsumasa Saito, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 19, 1984, Ser. No. 683,802

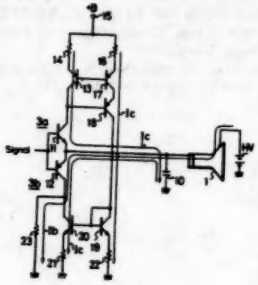
Claims priority, application Japan, Dec. 20, 1983, 58-240076; Dec. 22, 1983, 58-242541

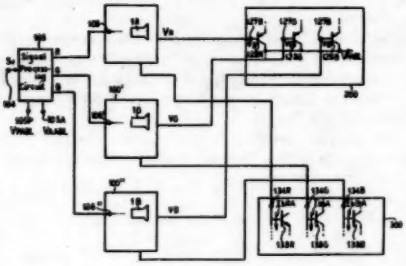
Int. Cl.[4] H04N *9/16, 9/31*

U.S. Cl. 358—74 **6 Claims**

1. In a television receiver a circuit for controlling the luminance level comprising: a plurality of cathode ray tubes; a plurality of beam current detection circuits each corresponding to one of said plurality of cathode ray tubes, each having a current source circuit connected to a cathode of each of said cathode ray tubes, each having a current sink circuit connected to the cathode of each of said cathode ray tubes, and each having a circuit for subtracting the current of said current

source circuit from the current of said current sink circuit; and a signal processing circuit for controlling the luminance level





of each of said cathode ray tubes in accordance with the peak values and the average values of the outputs of said detection circuits.

4,703,346

THREE-COLOR DRUM PRINTER WITH SPECIFIC RELATIONSHIP BETWEEN TRANSMISSION RATIO DRUM RADIUS AND INFORMATION CARRIER THICKNESS

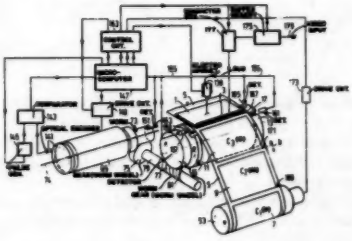
Waltherus C. J. Bierhoff, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 669,283, Nov. 7, 1984, abandoned. This application Jan. 28, 1987, Ser. No. 9,660

Claims priority, application Netherlands, Sep. 3, 1984, 8402680

Int. Cl.[4] H04N *1/46, 1/04, 1/06*

U.S. Cl. 358—75 **6 Claims**



1. A color printer comprising a row of printing members for printing a printed color image, said image comprising sequential lines of three different base colors, said printer including a circular cylindrical drum rotatable with respect to said printing members, said drum having a radius and a length of sheet-like information carrier wrapped around it and secured thereto, said information carrier having a given thickness and being movable under said printing members by rotation of said drum, a motor with a shaft and a transmission means having a transmission ratio and being connected between said motor shaft and said drum for rotating said drum in response to rotation of said motor shaft, wherein the transmission ratio of said transmission means is so selected that a first whole number of revolutions of the motor shaft turns the drum to move said information carrier a distance equal to 3x with respect to the printing members and wherein said transmission ratio, said drum radius and the thickness of the information carrier are so selected that for a second whole number of revolutions of said motor shaft during which the printer prints lines of one of said base colors the drum moves a location on said information carrier a distance equal to $2(\pi R)+x$ from the position at which said location was when said printer started printing said lines of said one base color whereby the printer can start to print lines of a different one of said base colors than the one it has just printed and wherein R is equal to the sum of the radius of said drum and the thickness of said information carrier, x is equal to the distance between two successive lines of different base colors in the printed color image and 3x is equal to the distance between two successive lines of the same base color in the printed color image.

4,703,347

INDIVIDUALITY DISCRIMINATING SYSTEM

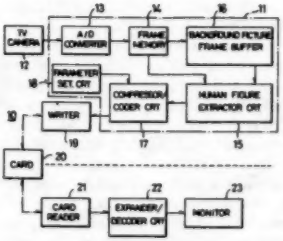
Akira Yasuda, Neyagawa; Kazuhisa Akiyama, Hirakata; Toshinari Nakao, Ikoma, and Hiroyoshi Yuasa, Hirakata, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Mar. 18, 1986, Ser. No. 840,747

Claims priority, application Japan, Mar. 25, 1985, 60-60002

Int. Cl.[4] H04N *7/18*

U.S. Cl. 358—102 **4 Claims**

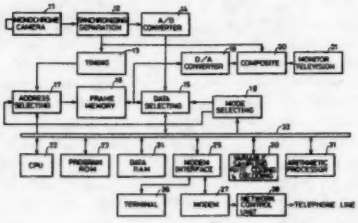


1. An individuality discriminating system comprising means for monitoring an individual, means connected to said monitoring means for digitizing an analog picture from the monitoring means into digital picture data in accordance with brightness of said analog picture and compressing, for further processing, picture elements of said digital picture data which are changed from predetermined picture elements, any other picture elements which show no such change being compressed as zero picture elements, means for writing said compressed picture data on a card to be used by said individual, means for reading said picture data off of said card through expansion and analog conversion of the compressed data, and means connected to said reading means for displaying said data.

4,703,348
PICTURE TRANSMISSION SYSTEM USING SECONDARY DIFFERENTIAL VARIABLE SAMPLING RATE CODING

Hiroyoshi Yuasa, Hirakata, and Koichi Omura, Osaka, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Apr. 24, 1985, Ser. No. 726,717
Claims priority, application Japan, Apr. 25, 1984, 59-83146; Jun. 25, 1984, 59-130582; Jun. 25, 1984, 59-130583
Int. Cl.[4] H04N 7/12; H04B 14/06
U.S. Cl. 358—133 6 Claims



1. A picture transmission system for sampling and compressing picture data in a television frame so as to code and transmit the same, said system comprising:

differential value forming means responsive to sampling values obtained by sampling said picture data and to predictors between lines for forming differential values therebetween;

compression-coding means for compression-coding said differential values from said differential value forming means to provide compression-coded differential values;

expansion-decoding means for expansion-decoding said compression-coded differential values from said compression-coding means to obtain expansion-decoded differential values; and

predicting means responsive to said expansion-decoded differential values for performing prediction to obtain aid predictors between lines;

wherein changed portions in said picture data and other picture data immediately before said picture data are extracted, and said predicting means performs prediction for said extracted changed portions;

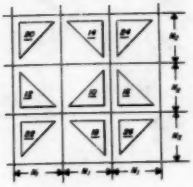
said system further comprising adding means connected between said expansion-decoding means and said predicting means for adding said predictors between lines from said predicting means and said decoded differential values from said expansion-decoding means to obtain added values, said predicting means processing said added values as predictors for subsequent sampling values;

wherein said picture data are obtained by successively vertically scanning data per horizontal scanning line of a television, said predicting means successively performing prediction for respective sampling points on said horizontal scanning line so as to store differential values between said respective sampling points and respective said predictors, thereby successively performing preposition prediction in the vertical direction on the basis of said stored differential values and sampling values of respective sampling points on a subsequent horizontal scanning line, said compression-coding means performing compression-coding on the basis of said differential values adapted to said preposition prediction in the vertical direction.

4,703,349
METHOD AND APPARATUS FOR MULTI-DIMENSIONAL SIGNAL PROCESSING USING A SHORT-SPACE FOURIER TRANSFORM

Jeffrey G. Bernstein, Lynn, Mass., assignor to PictureTel Corporation, Peabody, Mass.

Filed Mar. 19, 1985, Ser. No. 713,478
Int. Cl.[4] H04N 7/12, 1/40; G06F 7/34, 15/332
U.S. Cl. 358—133 40 Claims



1. A method for representing a pictorial image comprising the steps of

generating a digital representation of said image, and

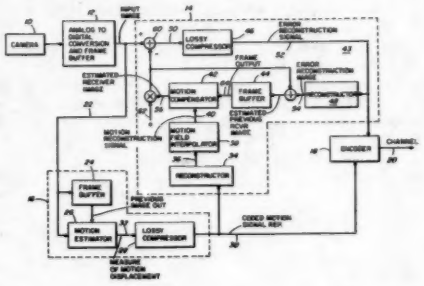
transforming said digital representation of said image, using a Short-Space Fourier transform having overlapping basis functions for generating a compacted digital representation of said image,

wherein said compacted digital representation requires fewer bits of data than said digital representation for representing said image.

4,703,350
METHOD AND APPARATUS FOR EFFICIENTLY COMMUNICATING IMAGE SEQUENCES

Brian L. Hinman, Lynn, Mass., assignor to PictureTel Corporation, Peabody, Mass.

Filed Jun. 3, 1985, Ser. No. 740,898
Int. Cl.[4] H04N 7/12, 7/18; G06K 9/36
U.S. Cl. 358—133 28 Claims



1. An image sequence transmission apparatus for transmitting a sequence of images over a channel comprising

means for estimating, for successive images of the sequence, a measure of the motion displacement between said successive images,

lossy coding means for representing said sequentially generated measures for an image as a coded motion signal representation,

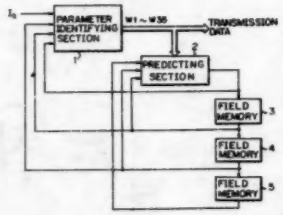
means for generating, using said coded motion signal representation, an error reconstruction signal, and

means for transmitting over said channel said coded motion signal representation and said error reconstruction signal.

4,703,351
APPARATUS FOR AN EFFICIENT CODING OF TELEVISION SIGNALS

Tetsujiro Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 22, 1985, Ser. No. 768,338
Claims priority, application Japan, Aug. 22, 1984, 59-174412
Int. Cl.[4] H04N *7/12, 7/18*
U.S. Cl. 358—135 **10 Claims**



1. An apparatus for efficiently coding television signals comprising:

memory means for storing predicted pixel data for a plurality of past fields;

means receiving true pixel data for a present field and connected to said memory means for identifying a plurality of non-pixel parameters to specify a time spatial relation which is defined by a linear combination of at least some of the true pixel data in the present field and at least some of said predicted pixel data in the past fields stored in said memory means;

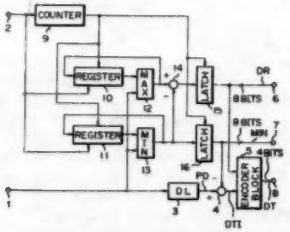
means for predicting new pixel data for said present field, each of said new pixel data being predicted from corresponding predicted pixel data for said past fields and the identified parameters, said new pixel data being stored in said memory means as predicted pixel data for a most recent field; and

means for transmitting only said identified parameters.

4,703,352
HIGH EFFICIENCY TECHNIQUE FOR CODING A DIGITAL VIDEO SIGNAL

Tetsujiro Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,775
Claims priority, application Japan, Dec. 19, 1984, 59-266407; Dec. 19, 1984, 59-266408; Dec. 21, 1984, 59-269868
Int. Cl.[4] H04N *7/12, 1/40*
U.S. Cl. 358—135 **8 Claims**



1. A highly efficient coding apparatus for coding digital video data in the form of blocks of digital video data representing plural picture elements so as to provide compressed video data, comprising:

first and second detecting means for detecting maximum and minimum values, respectively, of the digital video data representing the plural picture elements in each of said blocks,

means for generating dynamic range information for each said block from said maximum and minimum values for the respective block,

means for generating modified digital video data for each said block as the difference between each of the digital video data and one of said maximum and minimum values for said respective block,

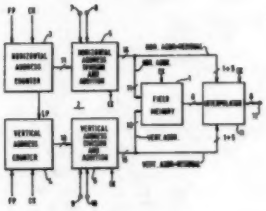
means for encoding said modified digital video data with a fixed digitized bit number less than the number of bits in said original digital video data so as to provide coded data of a reduced fixed bit length, and

transmitting means for transmitting the coded data of reduced fixed bit length and an additional code for each said respective block formed of at least two of said maximum and minimum values and a signal corresponding to said dynamic range information.

4,703,353
SIGNAL INTERPOLATORS

Morgan W. A. David, Surrey, United Kingdom, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 21, 1986, Ser. No. 921,234
Claims priority, application United Kingdom, Oct. 21, 1985, 8525926
Int. Cl.[4] H04N *7/01*
U.S. Cl. 358—140 **7 Claims**



1. A signal interpolator for time base expanding a portion of an input sample signal of given sample rate by deriving, from said input sample values, interpolated output sample values at said sample rate, the signal interpolator comprising:

an address generator comprising:

an address counter for supplying a sequence of initial sample position addresses at said sample rate and corresponding to input sample values in said input sample signal; and

means for deriving, from said initial addresses, a modified sequence of sample position addresses at said sample rate, said modified sequence containing address repetitions corresponding to the required degree of expansion, and also for deriving residual signals corresponding to subdivisions of the intervals between successive different addresses in said modified sequence; and

an interpolator for deriving each said interpolated output sample value in dependence on the value of a said residual signal and of a respective corresponding group of said input sample values.

4,703,354
NON-LINEAR SYNC SIGNAL PROCESSING CIRCUIT

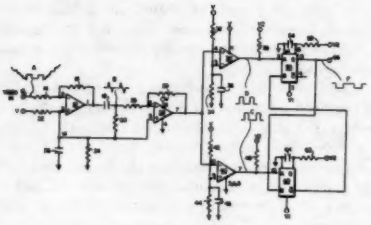
Frederick H. Auld, Jr., Wheeling, and David L. Walker, Arlington Heights, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed May 16, 1984, Ser. No. 610,560
Int. Cl.[4] H04N *5/04*
U.S. Cl. 358—148 **8 Claims**

1. A sync signal processing circuit for use in a television

system with a video signal including sync signals, each having first, second and third characteristics, comprising:

means for detecting said first characteristic in sync signals in said video signal;



means for detecting said second characteristic in sync signals in said video signal; and

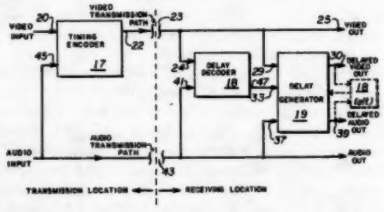
means for processing successive sync signals having said detected characteristics to determine if said third characteristic is correct.

4,703,355

AUDIO TO VIDEO TIMING EQUALIZER METHOD AND APPARATUS

J. Carl Cooper, 1373 Sydney Dr., Sunnyvale, Calif. 94087

Filed Sep. 16, 1985, Ser. No. 776,592
Int. Cl.[4] H04N *5/04*
U.S. Cl. 358—149 **34 Claims**



1. A delay system for an audio signal and a video signal comprising:

a timing encoder which develops a combination signal that includes said video signal and timing information generated from said audio signal;

a delay decoder responsive to said combination signal and to said audio signal, said delay decoder being operative to develop a delay signal representing the relative delay time between said combination signal and said audio signal by comparing the timing information of said combination signal with said audio signal; and

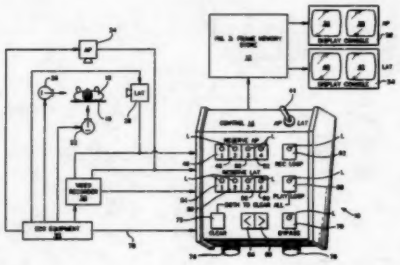
a delay generator responsive to said delay signal and operative to delay the least delayed of said combination signal and said audio signal by said relative delay time to resynchronize said combination signal with said audio signal.

4,703,356

TELEVISION MULTIPLE FRAME STORE WITH CYCLICAL REPEAT

William F. Herzog, Gilroy, and William E. Nichols, San Jose, both of Calif., assignors to Apert-Herzog Corporation, San Jose, Calif.

Filed Mar. 7, 1986, Ser. No. 837,514
Int. Cl.[4] H04N *5/14*
U.S. Cl. 358—160 **11 Claims**



1. For inclusion in a video path including a source of television picture images and a display, a memory for storing and for repetitively playing back at the display a consecutive sequence of picture frames derived from the source, the memory comprising:

input means for receiving said consecutive sequence of picture frames as digitized picture element values in a serial bit stream and for framing said stream into consecutive constant length pluralities of digital picture element words,

read/write solid state semiconductor frame memory array means arranged as a ring for storing and playing back a predetermined number of said consecutive video picture image frames,

output means for receiving constant length pluralities of digital picture element words read from said memory array means and for converting them into an analog picture signal for display on the display,

read/write memory array control means for controlling writing to and reading from said frame memory array means so that a selected segment of said consecutive video picture frames may be repeatedly played back without interruption at real time image display rate.

4,703,357

ADAPTIVE TELEVISION DEGHOSTING SYSTEM

Sheau-Bao Ng, Plainsboro, and Henry G. Lewis, Jr., Hamilton Square, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Dec. 24, 1985, Ser. No. 813,256
Int. Cl.[4] H04N *5/14, 5/38*
U.S. Cl. 358—166 **11 Claims**

1. A system for correcting multipath distortion comprising:

an input terminal for applying input signals including direct signals having training signal components and including delayed-direct (ghost) signals modulating a carrier signal;

demodulation means, coupled to said input terminal, for developing first and second signals representing baseband signals that are respectively in-phase with and quadrature-phase related to said carrier signal;

a complex samples data filter including:

real and imaginary input terminals coupled to receive said first and second baseband signals;

delay means for delaying the signals applied to said input terminals; and

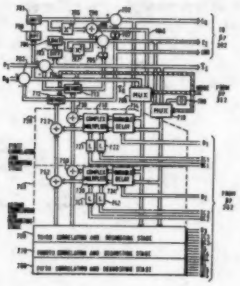
multiplying means for multiplying the signals provided by said delay means by complex filter coefficients;

wherein said filter develops output signals representing

said direct signals to the relative exclusion of said ghost signals; and

means, coupled internally to said filter, for developing said complex filter coefficients including:

means responsive to the output signals provided by said filter in response to said training signal for developing complex error signals representing residual ghost signals from said training signals;



means for arithmetically combining the complex error signals with the signals provided by said delay means to develop complex coefficient update values; and

means coupled to said combining means and to said filter for combining said complex coefficient update values with previously developed complex coefficient update values to develop said complex coefficients.

4,703,358

APPARATUS FOR PROCESSING A TELEVISION SIGNAL INCLUDING A MOVEMENT DETECTOR

Barry A. Flannaghan, Hampshire, United Kingdom, assignor to Independent Broadcasting Authority, England

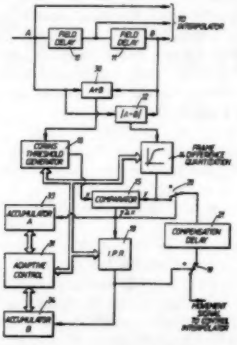
PCT No. PCT/GB85/00117, § 371 Date Nov. 15, 1985, § 102(e) Date Nov. 15, 1985, PCT Pub. No. WO85/04542, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 26, 1985, Ser. No. 800,614

Claims priority, application United Kingdom, Mar. 26, 1984, 8407764

Int. Cl.[4] H04N *5/21*

U.S. Cl. 358—167 **19 Claims**



1. Apparatus for processing a television signal comprising a movement detector and an interpolator responsive to an output from the movement detector, said movement detector including means for delaying said television signal to produce a delayed television signal, means for comparing a current television signal with said delayed television signal and producing a resultant signal indicative of the comparison, reference means for generating a reference signal, further comparing means for comparing the resultant signal from the first-mentioned comparing means with the reference signal whereby to produce output signals when the resultant signal is greater than the reference signal, said output signals being used to control operation of the interpolator, and modifying means coupled to said interpolator responsive to said output signals for determining when a particular one of said output signals differs from selected others of said output signals for modifying the effect of the output signals accordingly, and control means responsive to the output signal from the further comparing means for automatically altering the reference signal generated by the reference means whereby to reduce erroneous operation due to noise.

4,703,359

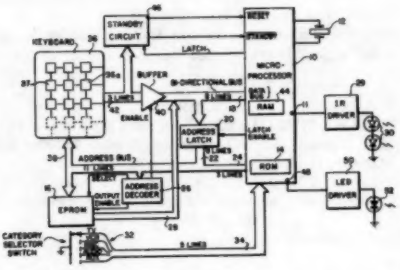
UNIVERSAL REMOTE CONTROL UNIT WITH MODEL IDENTIFICATION CAPABILITY

Robin B. Rumbolt; William R. McIntyre, both of Knoxville, and Larry E. Goodson, Blaine, all of Tenn., assignors to NAP Consumer Electronics Corp., New York, N.Y.

Continuation-in-part of Ser. No. 739,357, May 30, 1985. This application Nov. 20, 1985, Ser. No. 799,873

Int. Cl.[4] H04N *5/44*

U.S. Cl. 358—194.1 **13 Claims**



1. Method for adapting a remote control unit to generate appliance command signals having a required signal structure for controlling a selected one of a plurality of appliances of different categories and different manufacturers, each appliance being responsive to a different signal structure, comprising the steps of:

generating a selected category signal signifying the category of said selected one of said plurality of appliance under user control;

setting said selected appliance to execute a predetermined action upon receipt of a response-evoking signal having said required signal structure;

transmitting in sequence a plurality of response command signals each commanding said predetermined action in a different signal structure until said selected appliance executes said predetermined action, whereby the last-transmitted one of said response command signals constitutes said response-evoking signal having said required signal structure;

storing signal structure identification data corresponding to said required signal structure of said response-evoking signal, thereby creating stored signal structure identification data; and

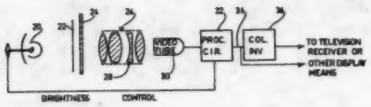
generating subsequent appliance command signals at least in part under control of said selected category signal and said stored signal structure identification data.

4,703,360

ELECTRONIC SLIDE PROJECTOR PROVIDING CHROMA AND LUMA INVERSION OF A COMPOSITE VIDEO SIGNAL

Ehud Shor, 19 Rehov Hameyasdim, Jerusalem, Israel

Filed Mar. 25, 1986, Ser. No. 843,782
Claims priority, application Israel, Mar. 25, 1985, 74711
Int. Cl.[4] H04N 3/36
U.S. Cl. 358—214 8 Claims



1. Color slide projection apparatus comprising:

means for receiving a composite video output signal from video tube apparatus arranged for receiving by direct illumination thereon, light passing through a color transparency slide which may be either positive or negative;

means for enabling selectable direct projection of a color negative transparency slide including

blue tinted filter means selectably locatable along the light path from the slide to the input of said video tube apparatus for removing the effect of an orange substrate of color negative transparencies; and

selectably energizable means for inverting the chroma and the luma portions of the composite video signal output of the video tube apparatus and

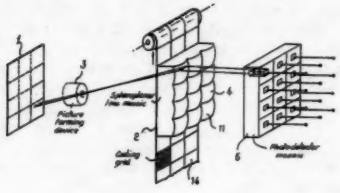
means for transmitting the composite video signal output of the selectably energizable means to a video display.

4,703,361

PICTURE MULTIPLEX ANALYSIS HYBRID DEVICE

André Girard, 52, avenue Jean Jaurès, 92290 Chatenay Malabry, France

Filed Jul. 12, 1985, Ser. No. 754,446
Claims priority, application France, Jul. 18, 1984, 84 11398
Int. Cl.[4] H04N 1/40
U.S. Cl. 358—260 6 Claims



1. Picture multiplex analyzing apparatus, comprising

(a) means (3) for forming the picture of an object in a given plane;

(b) a plurality of photodetectors forming a mosaic thereof (6);

(c) a plurality of optical devices (11) each sending light from a sector of the picture in its plane to the associated photodetector, respectively, the number of optical devices being equal to the number of photodetectors; and

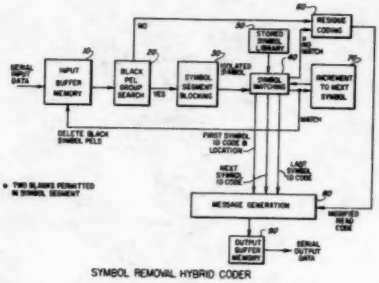
(d) encoding grid means (14) mounted for movement adjacent the plane of the picture for modulating the light beams received in the elementary areas forming a picture sector, said grid means including opaque portions corresponding to a binary 0, and transparent portions corresponding to a binary 1, said grid means being operable to modulate each elementary area beam by a binary, periodic and pseudo-random function, said beams being modulated by identical parts of said grid means.

4,703,362

MIXED-MODE SYMBOL REMOVAL METHOD FOR FACSIMILE DATA COMPRESSION

Alan R. Deutermann, Huntingdon Valley, Pa., and Charles D. Bodson, Arlington, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 17, 1985, Ser. No. 724,222
Int. Cl.[4] H04N 1/40
U.S. Cl. 358—263 5 Claims



SYMBOL REMOVAL HYBRID CODER

1. A method for data compression in a digital facsimile document wherein a serial input data is obtained by line-by-line scanning of a document having symbols of a certain font having a certain pitch and graphics which is to be transmitted, comprising the steps of:

storing a part of said serial input data corresponding to a number of scanned lines of said document at least equal to the pitch of the font of said symbols;

examining said stored part of said seral data starting from a left margin of each scanned line in order to locate a group of black pels;

coding by means of a Modified READ code said serial data corresponding to a line containing no black picture element groups;

isolating a first symbol of a group of black pels of a scanned line containing at least one group of black pels;

comparing said first symbol with a stored library of symbols to determine a match;

outputting, when a match has occurred, a first signal indicating a symbol identification code and location, a second signal to increment to the next symbol, and a third signal to delete said matched symbol from said stored input serial data;

outputting a non-matched symbol occurring from said step of comparing and repeating said step of comparing until a match has occurred;

coding by means of said Modified READ code said non-matched symbols;

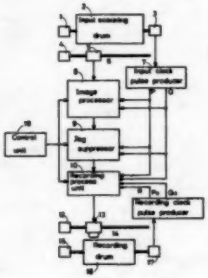
comparing said next symbol with said stored library and outputting, when a match has occurred, a next symbol identification code wherein said next symbol is located no more than 2 contiguous blank spaces from a previous symbol within said group of black pels and wherein when a last symbol within said group is matched a last symbol identification code is output; and

generating a message consisting of said first symbol identification code and location, each of said next symbol identification codes, said last symbol identification code and the results of both of said Modified READ coding in order to provide a serial output compression data which is a digital facsimile of said document.

4,703,363
APPARATUS FOR SMOOTHING JAGGED BORDER LINES

Hideaki Kitamura, Osaka, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Nov. 9, 1984, Ser. No. 669,784
Claims priority, application Japan, Nov. 10, 1983, 58-212225
Int. Cl.[4] H04N 1/40
U.S. Cl. 358—284 17 Claims



1. A method for smoothing a jagged border line between image components of a reproduction image, comprising the steps of:

(a) obtaining a sum S of a density value of a center pixel to which a positive weight coefficient is given and density values of its surrounding pixels to which negative weight coefficients are given;

(b) obtaining a value J according to the sum S;

(c) comparing the sum S with a predetermined fixed value R;

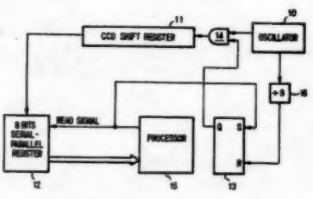
(d) selecting one of a density value V_m of a center pixel I_m and the value J obtained in the step (b) depending on a result of step (c) and providing the related density value to said center pixel; and

(e) repeating steps (a)–(d) for another center pixel to smooth the border line.

4,703,364
PROCESSOR SYNCHRONOUS IMAGE SCANNER CONTROLLING METHOD

Shigeki Asada, and Hiroshi Yanagisawa, both of Kanagawa, Japan, assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jun. 30, 1986, Ser. No. 880,471
Claims priority, application Japan, Jul. 5, 1985, 60-146919
Int. Cl.[4] H04N 1/04
U.S. Cl. 358—285 8 Claims



1. Method for transferring video data representing an image from a sensor unit to a processor unit in which the sensor unit and the image are moved relative to each other to successively scan said image and the sensor unit includes a photodiode array and a shift register, characterized by steps of:

starting to apply clock pulses to the shift register in synchronism with read signal generated by a processor unit to transfer video data of one scan line to the processor unit;

determining if a transfer time of the video data of the one scan line from the shift register to the processor unit exceeds a predetermined time period;

inhibiting a transfer of video data of next scan line from the photodiode array to the shift register when it is determined that the transfer time of the one scan line exceeds the predetermined time period;

allowing the transfer of the video data of the next scan line from the photodiode array to the shift register after the video data of the one scan line has been transferred to the processor unit;

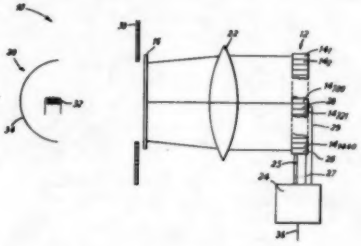
discarding the video data of the next scan line from the shift register to reset the shift register; and

transferring again the video data of the next scan line from the photodiode array to the shift register.

4,703,365
LINEAR IMAGE SENSOR HAVING SOME PARTS SELECTIVELY READ OR DISABLED

Ronald W. J. Mumford, Hitchin, England, assignor to Rank Cintel Ltd., England

Filed Jan. 30, 1986, Ser. No. 824,183
Claims priority, application United Kingdom, Feb. 7, 1985, 8503169
Int. Cl.[4] H04N 1/40
U.S. Cl. 358—293 4 Claims



1. A telecine projector sensor comprising a plurality of photosensitive cells arranged in a line for the receipt of a projected film image, each of said cells receiving a respective portion of said image and comprising means operable to generate and store a signal representing said respective portion of said image, said sensor further comprising an output port and shifting means operable to shift generated signals along said line of said cells to said output port, said generated signals being readable through said output port in serial form as they arrive at said output port, and said sensor further comprising disconnecting means operable to connect or to disconnect portions of said line of said cells, said portions of said sensor being respectively adjacent said output port and away from said output port, whereby operation of said disconnecting means allows signals to be read through said output port selectively from the whole of said line of said cells or from only said adjacent portion of said line of said cells.

4,703,366
VIDEO IMAGE PRINTER FOR PRINTING AN IMAGE DERIVED FROM A VIDEO SIGNAL

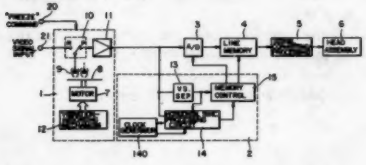
Yasunori Kobori; Kentaro Hanma, both of Yokohama, and Toshihiko Gotoh, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 31, 1985, Ser. No. 739,328

Claims priority, application Japan, Jun. 1, 1984, 59-110750; Nov. 2, 1984, 59-230146

Int. Cl.⁴ H04N *5/76*

U.S. Cl. 358—335 **10 Claims**



1. A printer for printing a video image onto printing paper by utilizing a video signal, comprising:

a storage means for receiving a plurality of video signals representing video images, and selectively storing a video signal representing a desired video image, said storage means including a rotatable recording/reproducing medium capable of being subjected to recording thereon and reproducing therefrom;

means for rotating said rotatable medium;

at least one recording/reproducing head means for recording the video signals representing the desired video image onto said rotatable medium and for repeatedly reproducing the recorded video signal from said rotatable medium;

a signal processing means connected to said storage means for sampling the recorded video signal repeatedly reproduced from said storage means, and converting the reproduced video signal into a plurality of printing lines each constituting a part of the desired video image to be printed; and

a printing head means connected to said signal processing means for successively printing said plurality of printing lines to form the desired video image onto printing paper.

4,703,367
RECORDING DISK DATA PLAYBACK APPARATUS

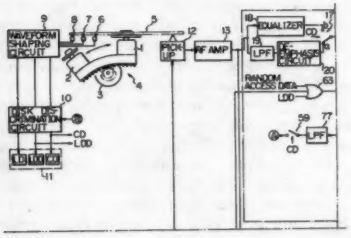
Minoru Kosaka, and Tutomu Banno, both of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 16, 1985, Ser. No. 776,706

Claims priority, application Japan, Sep. 14, 1984, 59-193706; Sep. 14, 1984, 59-193709

Int. Cl.⁴ H04N *5/76*

U.S. Cl. 358—339 **2 Claims**



1. In a recording disk playback apparatus capable of playback fo a recording disk having recorded thereon a video signal which may be accompanied by an audio signal which has been converted into a frequency modulated signal, and a digital signal superimposed on said frequency modulated signal, the improvement comprising:

pick-up means for producing a playback digital signal from said recording disk;

demodulator means for demodulating said playback digital signal;

memory means;

write-in means for writing said demodulated output from said demodulator means into said memory means in synchronization with a playback clock signal which is contained in said playback digital signal;

servo loop means for implementing position control of a read-out point across a surface of said recording disk along a direction which is tangential to a recording track on a recording disk to be played back; and

a read-out clock signal generating circuit for generating a read-out clock signal in synchronism with said playback clock signal, said read-out clock signal being utilized to read out data stored in said memory, said read-out clock signal generating circuit comprising a phase lock loop circuit for controlling the frequency of said read-out clock signal, said phase-lock loop circuit including a loop filter for bandwidth limitation connected therein, with the cut-off frequency of said loop filter being selected to be lower than the maximum frequency of the bandwidth of said servo loop.

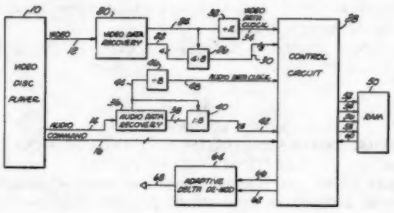
4,703,368
MULTIPLE VARIABLE RATE AUDIO MESSAGE RECORDING AND PLAYBACK

Wayne R. Dakin, Huntington Beach, Calif., assignor to Discovision Associates, Costa Mesa, Calif.

Continuation of Ser. No. 342,292, Jan. 25, 1982, abandoned. This application Oct. 2, 1985, Ser. No. 782,803

Int. Cl.⁴ H04N *5/76, 5/78*; G11B *17/00*

U.S. Cl. 358—342 **15 Claims**



1. A method for playing back a selected one of a plurality of discrete audio message units included in a block of composite digital audio data recorded on a record medium as a first sequential series of said plurality of discrete audio message units, and a second sequential series of a corresponding plurality of message pointer units, the entirety of said second sequential series occurring on the record medium upstream of the entirety of said first sequential series, said method comprising the steps of:

employing a player means for recovering said block of composite digital audio data from the record medium;

storing said recovered block of composite digital audio data within an address-accessible digital data storage means, each of said message pointer units being stored at fixed storage locations within said digital data storage means, and each of said audio message units being stored at predetermined storage locations within said digital data storage means, each said predetermined storage location having a predetermined starting address;

generating a coded message select signal identifying the selected one of said plurality of audio message units;

employing means operatively associated with said digital

data storage means and responsive to said coded message select signal for retrieving said message pointing unit corresponding to said selected audio message unit from its said fixed storage location within said storage means, each said message pointer unit including address code information indicating said predetermined starting address of its corresponding said audio message unit;

deriving said address code information from said retrieved message pointer unit corresponding to said selected audio message unit;

employing means responsive to said derived address code information for retrieving said selected audio message unit from its said predetermined storage location;

decoding the retrieved said selected audio message unit; and,

employing said player means to play back the decoded said selected audio message unit.

4,703,369

VIDEO FORMAT SIGNAL RECORDING AND REPRODUCING METHOD

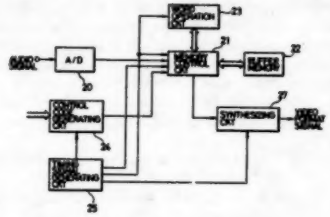
Yoshiaki Moriyama, and Sumio Hosaka, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 26, 1984, Ser. No. 654,575

Claims priority, application Japan, Sep. 26, 1983, 58-178642; Sep. 26, 1983, 58-178643

Int. Cl.[4] H04N 5/76

U.S. Cl. 358—343 **16 Claims**



15. A method for recording a video format signal including video information representing an image to be displayed and accompaniment data representing a plurality of accompaniments which may be reproduced with said image, said video format signal including a plurality of successive frames with each frame having plural lines and each line having a synchronizing signal portion followed by an information signal portion, said method comprising the steps of:

dividing said accompaniment data into a plurality of data groups with each group representing a different accompaniment;

generating identification codes indicating at least positions of respective ones of said data groups within said video format signal; and

recording said identification codes with said data groups and video information on a recording medium in the information signal portions of said video format signal, with at least one frame of said video format signal including portions of at least two of said plurality of groups.

4,703,370

HELICAL SCAN TYPE MAGNETIC TAPE REPRODUCING APPARATUS WITH VARIABLE HEAD-DRUM INCLINATION CAPABILITY

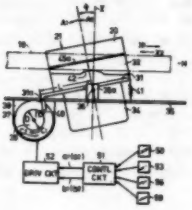
Osamu Inoue, and Akira Ohbayashi, both of Yokohama, Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Feb. 27, 1985, Ser. No. 706,110

Claims priority, application Japan, Mar. 5, 1984, 59-31464[U]

Int. Cl.[4] G11B 5/588; H04N 5/783

U.S. Cl. 360—10.2 **4 Claims**



1. A magnetic tape reproducing apparatus comprising:

a tape guide drum assembly comprising rotary video heads, a stationary drum, a rotary drum rotatably provided on top of said stationary drum and mounted with said rotary video heads, a drum motor fixed under said stationary drum for rotating said rotary drum, pins disposed at diametrical positions of said tape guide drum assembly, and a tape lead disposed on said stationary drum to have an arcuate shape about one of said pins, said tape guide drum assembly being spirally wrapped with a magnetic tape on an outer peripheral surface thereof, said magnetic tape having a track pattern in which video tracks are formed obliquely to the tape longitudinal direction;

support means for pivotally supporting said tape guide drum assembly at said pins; and

inclination angle varying means for varying the inclination angle of said tape guide drum assembly in a special reproduction mode of the reproducing apparatus, said special reproduction mode being a reproduction mode in which said magnetic tape moves with a tape moving speed and/or a tape moving direction different from a tape moving speed and/or a tape moving direction in a normal reproduction mode, said normal reproduction mode being a reproduction mode in which said magnetic tape moves at a tape moving speed and a tape moving direction essentially identical to a tape moving speed and a tape moving direction at the time of a recording, said inclination angle varying means varying the inclination angle of said tape guide drum assembly in said special reproduction mode in one of two mutually opposite directions with respect to a reference inclination angle of said tape guide drum assembly at the time of said normal reproduction mode, said inclination angle varying means varying the inclination angle of said tape guide drum assembly depending on the tape moving speed and tape moving direction of said magnetic tape in said special reproduction mode so that an inclination angle of scanning loci of said rotary video heads with respect to the tape longitudinal direction becomes equal to an inclination angle of said video tracks with respect to the tape longitudinal direction.

4,703,371

DISK DRIVE FORMATTING

Donald R. Redmond, San Jose, and John H. Dieckman, Sunnyvale, both of Calif., assignors to Xebec, Carson City, Nev.

Filed Mar. 4, 1985, Ser. No. 707,756

Int. Cl.[4] G11B 5/54

U.S. Cl. 360—75 **8 Claims**

1. A method of formatting the drive for a magnetic data

storage disk utilized in combination with a controllably movable read/write transducer comprising the steps of:

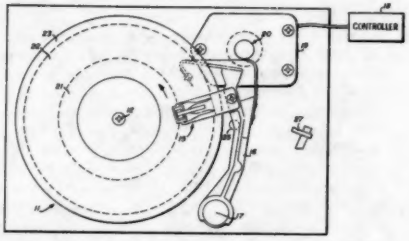
a. providing a first stationary mechanical stop member to prevent the read/write transducer from moving radially inward beyond a first point relative to the surface of the disk;

b. positioning the read/write transducer against the first stationary mechanical stop member;

c. controlling the read/write transducer to move a first number of incremental steps radially outward across the face of the magnetic data storage disk and, at each incremental step, magnetically encoding information on the face of the disk to identify separate tracks as being members of a first guard band of concentric tracks;

d. controlling the read/write transducer to move a second number of incremental steps radially outward across the face of the disk and, at each step, magnetically encoding information on the disk to identify separate tracks as being members of a band of concentric data storage tracks;

e. controlling the read/write transducer to move a third number of incremental steps radially outward across the



magnetic storage disk and, at each incremental step, magnetically encoding information on the disk to identify separate tracks as being members of a second guard band of concentric tracks;

f. immediately after a step is taken to a radially outward track, the read/write transducer is controlled to read track identifying information, if any, from the track upon which it is located and, if no track identifying information is available on the track for reading, proceeding to control the read/write transducer to magnetically encode information upon the track to identify its radial position relative to the face of the disk; and

g. prior to the read/write transducer stepping from one track to another,the read/write transducer is controlled to read the track identifying information from the track on which it has just written information to verify that the information so read is the same as the information previously written, such that defection sections of the disk are identified; and, upon said verification, controlling the movement of the read/write transducer to incrementally step to a radially adjacent track.

4,703,372

PORTABLE ELECTROCARDIOGRAPHIC RECORDER

Herman G. Bender, Hillsboro; Fred J. Shipley, Beaverton, and Gary C. Vance, Portland, all of Oreg., assignors to Spacelabs, Inc., Chatsworth, Calif.

Filed Mar. 8, 1985, Ser. No. 709,629

Int. Cl.[4] G11B *5/008*

U.S. Cl. 360—96.1 **7 Claims**

1. A portable apparatus for recording electrocardiographic signals on a tape of a cassette over an extended playing period, said apparatus comprising:

a relatively planer case having a bottom and a top movably mounted to said bottom between an open and closed position;

a support means mounted to said case for supporting said cassette in said case;

a power source terminal contained within said case for coupling to a portable power source;

means for moving said tape within said cassette in response to power from said terminal, said moving means further comprising a capstan and movable pinch roller for driving said tape;

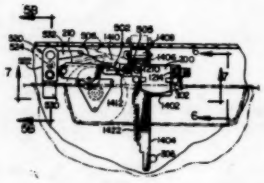
a recording means for recording ECG information on said tape, said recording means automatically movable between a remote non-recording position and a recording position proximate said moving tape with the opening and closing, respectively, of the top of said case, said recording means further comprising:

a recording head;

a slide assembly slidably mounted to said support means for supporting said recording head, said slide assembly further comprising:

a main body portion and elongated portion connected to said body portion;

a roller support coupled to a first side of said body portion adjacent the top and bottom of said case where said top is movably mounted to said bottom, said roller support for supporting a roller for rotating engagement with said case as the top of said case is closed;



a pawl member and roller spring coupled to said body portion and engaging said pinch roller for biasing said pinch roller against said tape and capstan when the case is in the closed position and for moving said pinch roller away from said tape and capstan when said recorder is in the open position, said apparatus further comprising:

means movable along an axis between a depressed position and a biased position for preventing said roller spring from biasing said pinch roller against said capstan when said case is empty, said means comprising:

first biasing means for biasing said preventing means to said biased position;

a first pawl member disposed for engagement with said cassette when said cassette is positioned in said case to maintain said preventing means in said depressed position; and

a second pawl member disposed for placement between said roller spring and said pinch roller when said case is open and empty of said cassette, whereby when said case is closed without a cassette said roller spring is prevented from engaging said pinch roller.

4,703,373

DEVICE FOR LOADING OR UNLOADING MAGNETIC DISC PACK

Shigenori Oosaka, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 648,228, Sep. 7, 1984, abandoned. This application Apr. 24, 1986, Ser. No. 855,230

Claims priority, application Japan, Sep. 8, 1983, 58-165470; Jul. 20, 1984, 59-150656

Int. Cl.[4] G11B *17/035, 17/04*

U.S. Cl. 360—97 **9 Claims**

1. A device for loading or unloading a magnetic disc pack in

a magnetic recorder and/or reproducer, wherein magnetic recording is effected into a magnetic disc rotatably mounted in said magnetic disc pack or reproduction is effected therefrom, comprising:

a main body, having provided thereon a driving motor having a rotary driving shaft;

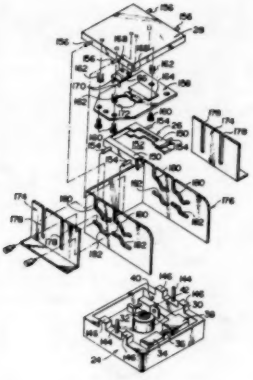
a cassette holder for receiving said magnetic disc pack, and projectingly provided at the side edges thereof with first guide pins;

a lid projectingly provided at side edges thereof with second guide pins;

a push member, provided on said lid, for pushing a center core of said magnetic disc toward the rotary drive shaft;

side plates provided at opposite sides of the main body and having controlling grooves formed thereon, said controlling grooves receiving said first and second guide pins; and

a slide plate movably provided on the main body, said slide plate having first guide grooves for receiving said first guide pins, said first guide grooves being shaped so as to guide the cassette holder from a first cassette holder position for inserting and removing the magnetic disc pack to a second cassette holder position for reproduction and



recording wherein the center core of the magnetic disc is engaged with the rotary drive shaft, wherein said first guide grooves include first lateral grooves which define said first cassette holder position and second lateral grooves which define said second cassette holder position,

said slide plate further having second guide grooves for receiving said second guide pins, said second guide grooves being shaped so as to guide the lid from a first position of non-contact between said push member and said center core, through a second position of contact between said push member and said center core, to a third position of non-contact between said push member and said center core, said first and third lid positions being different from each other, wherein said second guide grooves include overstroke grooves which define said second position of contact and third lateral grooves, contiguous with said overstroke grooves, which define said third position of non-contact, movement of said slide plate moving said cassette holder into contact with said rotary drive shaft and moving said lid at the same time so that the push member is brought into and out of contact with the center core, said push member being out of contact with the center core during reproduction and recording.

4,703,374

MAGNETIC DISK MEMORY HAVING A DISK PACK SEATED AT BOTH SIDES IN RESILIENTLY-DESIGNED HOUSING

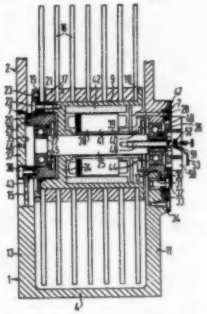
Johann Biermeier, Munich; Otto Olbrich, Taufkirchen, and Albert Dierkes, Planegg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 29, 1985, Ser. No. 696,202

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1984, 3404208

Int. Cl.[4] G11B *5/012*

U.S. Cl. 360—98 **35 Claims**



1. A magnetic disk memory comprising:

an assembly including a spindle having an axis of rotation, a plurality of magnetic disks, disk mounting means mounting said magnetic disk for rotation with said spindle, and disk driving means integrated into said disk mounting means;

a housing, including a one-piece hollow support shell and a cover for said shell, said housing comprising first and second parallel opposed walls, each having an each for receiving said cover, said first wall comprising a slot in said edge and said second wall comprising a resilient section, including a region arranged opposite to said slot and having a reduced wall thickness with respect to the thickness of said second wall;

said spindle including first and second ends and having its axis of rotation coinciding with respective centers of said slot and said resilient section;

first and second bearings, each including an inner part mounted on a respective end of said spindle and an outer part;

first and second bearing mounting means respectively mounting said outer parts of said first and second bearings within said slot of said first wall and to said resilient section of said second wall; and

a plurality of screws securing said first and second bearing mounting means to the respective walls and tensing said bearings in parallel to the axis of rotation of said spindle by inwardly flexing said resilient section.

2. A magnetic disk memory comprising:

a housing including a hollow support shell and a cover for said shell, said shell comprising first and second opposed walls, said first wall comprising an edge and a slot in said edge including a 180° curved slot floor, said second wall including a resilient section opposite to said slot;

a spindle including an axis of rotation and first and second end pegs;

a plurality of magnetic disks;

disk mounting means mounting said plurality of magnetic disks spaced apart for rotation about the axis of rotation of said spindle;

first and second ball bearings each including an inner ring mounted on a respective end peg, and an outer ring;

first and second bearing bushings respectively mounting said outer rings of said ball bearings;

said first bearing bushing disposed in said slot and secured to said first wall; and

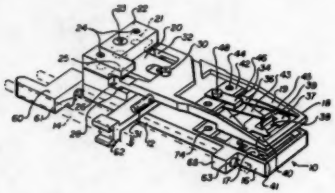
tensioning means connecting said second bearing bushing to said resilient region and tensioning said bearings parallel to the axis of rotation of said spindle by inwardly flexing said resilient section.

4,703,375

LOW MASS TRICOMPLAINT RECORDING DEVICE FOR DOUBLE SIDED FLOPPY DISK MEDIA

John R. Chan, Fremont, and Homer S. Pitner, Jr., Santa Clara, both of Calif., assignors to Chan Industries, Inc., Santa Clara, Calif.

Filed Nov. 22, 1985, Ser. No. 801,143
Int. Cl.[4] G11B *5/54, 21/22*
U.S. Cl. 360—105 **11 Claims**



1. An improved magnetic head carriage and suspension apparatus, comprising:

a carriage body including means for engaging said body, and a guide which defines a predetermined path over which said apparatus is to move relative to a floppy disk media, and means for attaching said body to a drive means for moving said apparatus along said predetermined path:

a first magnetic read/write head;

a first head support arm attached to said body and having means forming a first stop;

first suspension means affixed to said first arm and adapted to carry said first head between a first limit position defined by engagement with said first stop, and a sprung position out of engagement with said first stop;

a first load spring affixed to said first arm and adapted to resiliently engage said first suspension means and to exert a predetermined loading force thereupon tending to bias said first head towards said first stop;

a second magnetic read/write head;

a second head support arm pivotally attached to said body and rotatable between a media engaging position and a retracted position, said media engaging position being defined by a second stop means which limits motion of said second arm in one direction relative to said body, said second arm having means forming a third stop;

second suspension means affixed to said second arm and adapted to carry said second head between a second limit position, defined by engagement with said third stop, and a sprung position out of engagement with said third stop; and

a second load spring affixed to said second arm and adapted to resiliently engage said second suspension means and to exert a predetermined loading force thereupon tending to bias said second head toward said third stop;

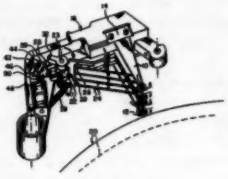
whereby when said second arm is in said retracted position, said first and second heads are respectively supported and biased into predetermined fixed positions relative to said first and second arms, as determined by engagement with said first and third stops, and when said second arm is in said media engaging position, said first and second heads are caused to engage opposite sides of said media and to be moved out of engagement with said first and third stops and into said sprung positions with loading forces determined solely by said first and second load springs.

4,703,376

APPARATUS FOR LOADING AND RETRACTING MAGNETIC HEAD IN A DISK DRIVE

John R. Edwards, Mountain View; George D. Popov, Milpitas, and John B. Philbrick, Fremont, all of Calif., assignors to LaPine Technology, Milpitas, Calif.

Filed Sep. 23, 1985, Ser. No. 778,883
Int. Cl.[4] G11B *5/48, 5/54*
U.S. Cl. 360—105 **10 Claims**



1. An apparatus for loading and retracting magnetic heads relative to the surfaces of magnetic disks comprising:

a rotatable arm;

a plurality of head flexures supporting a multiplicity of magnetic heads mounted to said arm;

a comb-like structure having a plurality of lift pins extending adjacent to respective surfaces of said flexures;

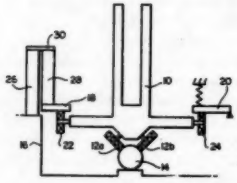
means for moving said comb structure and lift pins so that in a first position of said pins said heads are loaded relative to rotating disks, and in a second position of said pins said heads are lifted and unloaded, so that said flexures are securely maintained in spaced relation to said disks, said moving means comprising means for retracting said lift pins fully so that they lose contact with said flexures whereby said magnetic heads are loaded for transducing relation relative to said magnetic disks, and means for engaging said lift pins with said flexures so that the flexures and heads are lifted away from the disks and retained in a rigid position during the unloaded or nonoperational mode of the disk drive.

4,703,377

THERMAL COMPENSATION FOR DISK DRIVE CARRIAGE ASSEMBLY

Henry B. Hazebrouck, Sunnyvale, Calif., assignor to Priam (Delaware) Corporation, San Jose, Calif.

Filed Feb. 6, 1986, Ser. No. 826,689
Int. Cl.[4] G11B *5/55*
U.S. Cl. 360—106 **11 Claims**



1. A disk drive for recording and reading of data including a carriage assembly for transporting transducers bidirectionally relative to a record medium comprising:

a carriage structure;

a base for supporting said carriage structure;

an outrigger bearing means fastened to the sides of said carriage structure;

a fixed guide plate positioned at one side of said carriage for constraining the bearing means disposed at said one side;

a spring-loaded guide plate located at an opposite side of said carriage structure for providing a load force to the bearing means disposed at said opposite side;

at least one thermally compensating element positioned in thermal contact with said carriage structure and between said base and said fixed guide plate, whereby a temperature change affecting dimensions of said carriage structure are offset and temperature-induced roll of the carriage structure is reduced.

4,703,378

MAGNETIC TRANSDUCER HEAD UTILIZING MAGNETORESISTANCE EFFECT

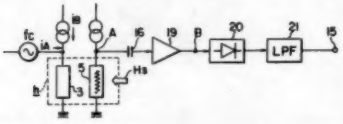
Shigeyoshi Imakoshi; Hideo Suyama; Yutaka Soda; Munekatsu Fukuyama, and Yasuhiro Iida, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,706

Claims priority, application Japan, Mar. 1, 1984, 59-38980; Jun. 8, 1984, 59-117625; Aug. 24, 1984, 59-176476; Aug. 28, 1984, 59-178833; Aug. 28, 1984, 59-178831

Int. Cl.[4] G11B *5/127*

U.S. Cl. 360—113 **15 Claims**



1. A magnetic transducer head utilizing magnetoresistance effect, comprising:

a magnetoresistance effect sensing element means for sensing a signal magnetic field on a travelling magnetic recording medium;

means for applying a high frequency magnetic field to said sensing element means;

means for obtaining an output from said sensing element means;

means for rectifying said output to form a rectified signal; and

low pass filter means supplied with said rectified signal for deriving an output corresponding to said signal magnetic field.

4,703,379

HARD DISK DRIVE WITH ERASING APPARATUS

Michael Bogdanski, Salzkotten, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Continuation of Ser. No. 661,411, Oct. 16, 1984, abandoned. This application Feb. 9, 1987, Ser. No. 12,692

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1983, 3337845

Int. Cl.[4] G11B *5/024*

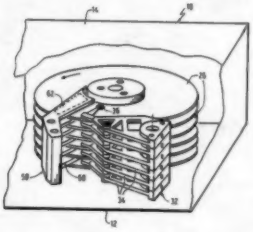
U.S. Cl. 360—118 **8 Claims**

1. A self-contained hard disk drive unit comprising:

a driveable disk carrier having a plurality of magnetic disks mounted thereon such that each of said magnetic disks is substantially parallel and spaced with respect to the next adjacent disk, said disk carrier being adapted to rotate about a central axis;

a regulating device mounted adjacent the disk carrier having a plurality of carrier arms with each of said arms having a magnetic read-write head, said regulating device including means for traversing each of said read-write heads across a respective one of said plurality of disks as said disk carrier rotates;

a stationary air conduction comb mounted adjacent said regulating device, said comb having a plurality of fingers with each of said plurality of fingers being aligned with and positioned before a respective carrier arm with respect to the path of travel of said rotating disk to deflect contaminants to prevent said contaminants from reaching said read-write heads; and



a plurality of activatable erasing means respectively on said comb fingers adjacent said disk, said erasing means being activatable to erase said disks as said disks rotate to provide an erased and substantially contaminant free disk to said respective read-write heads as said disk rotates.

4,703,380

PERPENDICULAR MAGNETIC HEAD

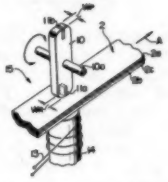
Tatsuo Imamura; Hiroyuki Yamamoto, both of Hachioji, and Yutaka Yunoki, Kunitachi, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Jan. 31, 1985, Ser. No. 696,702

Claims priority, application Japan, Feb. 1, 1984, 59-16795

Int. Cl.[4] G11B *5/265, 5/29*

U.S. Cl. 360—121 **30 Claims**



1. A perpendicular magnetic head comprising:

a first main pole for recording information on a magnetic recording medium, said main pole comprising a soft magnetic film having a first relatively high saturation magnetization and a first relatively low initial permeability; and

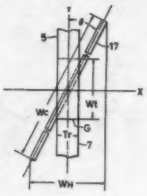
a second main pole for reproducing information from the magnetic recording medium, said second main pole comprising a soft magnetic film having a second relativley high initial permeability which is substantially higher than said first initial permeability of said first main pole and having a second relatively low saturization magnetization which is substantially lower than said first saturization magnetization of said first main pole, said second pole being spaced from said first main pole and said first and second main poles being formed on a single substrate, said substrate being rotaably supported around an axis penetration therethrough.

4,703,381

MAGNETIC HEAD WITH A FILM COIL

Norio Shibata, Sagamihara, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Continuation of Ser. No. 462,245, Jan. 31, 1983, abandoned. This application Apr. 16, 1986, Ser. No. 854,723
Claims priority, application Japan, Feb. 9, 1982, 57-18237
Int. Cl.[4] G11B *5/17*
U.S. Cl. 360—123 **17 Claims**



1. A multi-track head having a plurality of aligned magnetic heads, adjacent magnetic head pairs forming spaces therebetween, each of said magnetic heads comprising:

(a) a core assembly having first and second core halves facing each other and forming a head gap therebetween, said first core half having a recess at a side where said first core half faces said second core half for forming a substantially U-shaped core half having front and rear ribs and a web interposed between said front and rear ribs, said front rib together with said second half forming said head gap on a front side surface of each of said magnetic heads, said first and second core halves forming a closed magnetic path along a plane including surfaces of said first and second ore halves, and

(b) a film coil assembly including a flexible, sheet-like film base having a through-hole at its center, said film base having spirally printed thereon a coil around said through-hole, said film coil assembly being set into said core assembly by having said rear rib of said first core half passing through said through-hole whereby only said rear rib is circumferentially surrounded by said coil assembly, portions of said film coil assembly protruding away from surfaces of said rear rib perpendicular to said front side surface, each of said portions being bent to form a planar configuration having an angle acute to one of said surfaces of said rear rib;

wherein, for said multi-track head, except for respective outer bent portions of two outermost core assemblies of said plurality of aligned magnetic heads, the bent portions of the film coil assemblies of said plurality of magnetic heads are positioned within the spaces formed by said adjacent magnetic head pairs.

2. A multi-track head having a plurality of aligned magnetic heads, adjacent magnetic head pairs forming spaces therebetween, each of said magnetic heads comprising:

(a) a core assembly having first and second core halves facing each other for forming a head gap therebetween, said first core half having a recess at a side where said first core half faces said second core half for forming a substantially U-shaped core half having front and rear ribs, said first and second core halves forming a closed magnetic path along a plane parallel to side surfaces of said first and second core halves, and

(b) a film coil assembly including a flexible, sheet-like film base having a through-hole at its center, said film base having spirally printed thereon a coil around said through-hole, said film coil assembly being incorporated into said core assembly by having said rear rib of said first core half passing through said through-hole, spirally printed, planar coil portions on said film coil assembly protruding away from the side surfaces of said core assembly, each of said portions extending at an acute angle to said side surfaces of said core assembly;

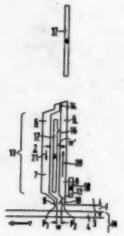
wherein, for said multi-track head, except for respective outer protruding coil portions of two outermost core assemblies of said plurality of magnetic heads, the protruding portions of the coil assemblies of said plurality of magnetic heads are positioned within the spaces formed by said adjacent magnetic head pairs and extend as a continuous structure between all of the core assemblies.

4,703,382

THIN-FILM MAGNETIC HEAD FOR PERPENDICULAR (VERTICAL) RECORDING

Herbert Schewe, Herzogenaurach, and Heinrich Diepers, Hochstadt/A., both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 20, 1984, Ser. No. 684,030
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1983, 3346777
Int. Cl.[4] G11B *5/127*
U.S. Cl. 360—125 **12 Claims**



1. A magnetic thin-layer head comprising a stratified build-up on a nonmagnetic substrate for a recording medium, the recording medium being provided with a magnetizable storage layer into which information can be written along a track by perpendicular or vertical magnetization of the storage layer, the magnetic head having a ring-shaped conduction body for carrying magnetic flux, the conduction body having two magnet legs, ends of the magnet legs facing the recording medium comprising magnetic poles, the poles being arranged in tandem as seen in the direction of motion of the head relative to the recording medium, and having a predetermined distance from each other, an at least largely flat write/read coil winding being further provided having a plurality of turns, said turns of said winding extending through a space formed between the magnet legs, and further comprising an additional coil winding provided only for executing a write function together with said write/read coil winding, said additional coil winding having at least one turn which is disposed at least partially in a region located outside of the ring-shaped conduction body and being separated from said write/read coil winding by one of said two magnet legs, said one leg serving as a leg for executing substantially alone said write function, the current in said write/read coil winding having a first current flow direction and the current in said additional coil winding having a current flow direction opposite to said first current flow direction during execution of said write function.

4,703,383

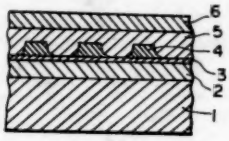
COIL CONDUCTOR STRUCTURE IN THIN-FILM MAGNETIC HEAD

Yoshiaki Katou; Joe Ueoka, and Satoshi Yoshida, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Oct. 3, 1985, Ser. No. 783,577
Claims priority, application Japan, Oct. 5, 1984, 59-209067
Int. Cl.[4] G11B *5/17, 5/31*
U.S. Cl. 360—126 **4 Claims**

1. A thin-film magnetic head comprising a lower magnetic

layer, a first insulating layer, a coil conductor, a second insulating layer, and an upper magnetic layer accumulated in this order characterized in that the cross-section of said coil conductor has a trapezoidal shape having substantially triangular



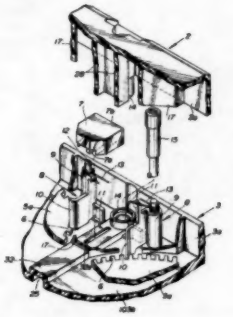
cross-sectional portions disposed at portions of said coil conductor adjacent to said first insulating layer at the lowest end of the sides of said coil conductor, one side of said triangular portions being disposed on said first insulating layer.

4,703,384

MAGNETIC TAPE CASSETTE WITH REEL-LOCK MECHANISM

Hideaki Kawada; Kazuo Ike, both of Kanagawa; Tsuneo Nemoto, and Kiyoshi Omori, both of Miyagi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 18, 1985, Ser. No. 756,246
Claims priority, application Japan, Jul. 21, 1984, 59-151498
Int. Cl.[4] G11B *15/32*; G03B *1/04*
U.S. Cl. 360—132 **12 Claims**



1. A magnetic tape cassette comprising:

a substantially rectangular cassette casing having a tape access opening along one side thereof and including a bottom wall having a guide groove in its under surface which extends perpendicular to said one side of the rectangular cassette casing and is substantially centered in respect to the length of said one side;

a pair of tape reels rotatable within said cassette casing at opposite sides of the location of said guide groove and onto which a magnetic tape is wound;

first locking members coupled with said tape reels for rotation therewith;

a pair of second locking members located within said cassette casing in an area adjacent a side of said cassette casing in opposing relation to said one side, and each cooperating with a respective one of said first locking members to establish locking engagement with the latter so as to prevent said tape reels from rotating, said second locking members being pivotable in a first direction to establish said locking engagement and in a second direction to release said locking engagement;

biasing means biasing each of said second locking members in said first direction; and

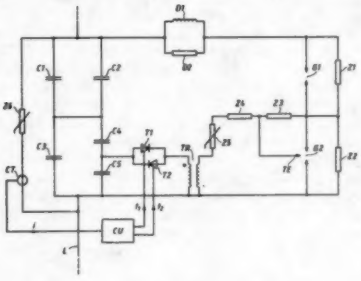
lock releasing means cooperating with said second locking members to actuate said second locking members in said second direction, said lock releasing means having a projection projecting downwardly through said bottom wall of said cassette casing into said guide groove, said projection being arranged to be engaged by a guide member of a recording and reproducing apparatus which extends into and moves relatively along said guide groove so as to actuate said lock releasing means for moving said second locking members in said second direction simultaneously with the guiding of the tape cassette being loaded into said recording and reproducing apparatus.

4,703,385

PROTECTIVE CIRCUIT FOR SERIES CAPACITOR BANKS

Lennart Stenström, Ludvika, Sweden, assignor to Asea Aktiebolag, Sweden

Filed Apr. 23, 1986, Ser. No. 854,918
Int. Cl.[4] H02H *7/16*
U.S. Cl. 361—16 **6 Claims**



1. A protective circuit used in a series capacitor bank in a high voltage network, said circuit comprising:

a voltage-dependent resistor connected in parallel with said capacitor bank,

a spark gap circuit means for shunting the latter in case of overload thereof, said circuit means including at least two-series-connected spark gaps each provided with control impedances,

an overload detector for said resistor,

a pulse transformer for generating a high voltage pulse for triggering said spark gap means in case of resistor overload, said transformer having a low voltage winding and a high voltage winding,

an auxiliary capacitor adapted to be charged during overload operation of the protective circuit,

a switching means,

said low voltage transformer winding being connected to said auxiliary capacitor through said switching means for charging said auxiliary capacitor upon closing of said switching means,

said switching means being open during normal operation and being controlled by said overload detector in such a way that it closes in response to the resistor overload condition for triggering said spark gap means,

said high voltage traneformer winding being connected in series with a resistor means across one of said spark gaps and its control impedance, said resistor means including a metal oxide varistor, and

said transformer being so connected within the circuit that said generated high voltage pulse is in opposition to the voltage across the capacitor bank.

4,703,386

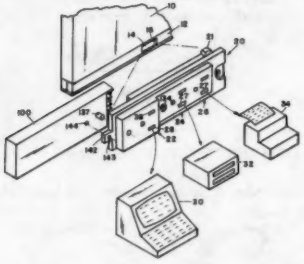
POWER RECEPTACLE AND ASSOCIATED FILTER

Larry A. Speet, Holland, and Bruce A. Rentz, Kentwood, both of Mich., assignors to Steelcase, Inc., Grand Rapids, Mich.

Filed Jun. 8, 1984, Ser. No. 618,562

Int. Cl.[4] H02H *1/04;* H02G *3/10*

U.S. Cl. 361—56 **23 Claims**



1. An electrical receptacle for installation in an electrical raceway in a modular office panel, said raceway including an electrical supply conductor for supplying electrical power to said receptacle, said receptacle comprising:

a housing shaped to be mounted in a raceway of a modular office panel including a plurality of electrical outlets mounted therein said housing integrally included outlet coupling means within said housing for electrically coupling said outlets in parallel relationship, said outlet coupling means responsive to means selectively contained by the raceway for electrically isolating at least one of said outlets from the remaining outlet of said housing; and

means for coupling said outlet coupling means to a conductor for receiving electrical power therefrom.

4,703,387

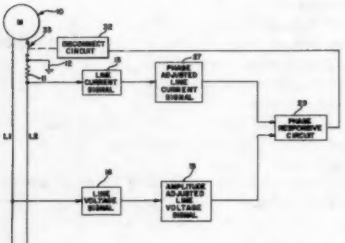
ELECTRIC MOTOR UNDERLOAD PROTECTION SYSTEM

Thomas A. Miller, Bluffton, Ind., assignor to Franklin Electric Co., Inc., Bluffton, Ind.

Filed May 22, 1986, Ser. No. 865,755

Int. Cl.[4] H02H *3/26*

U.S. Cl. 361—79 **5 Claims**



1. An underload protection system adapted to be connected to an electric motor and first and second power supply lines, the lines being connectable to an AC power supply supplying a line voltage and line current, said system comprising line voltage sensing means adapted to be connected to said lines and to have a line voltage signal impressed therein, an amplitude adjustment circuit connected to said voltage sensing means and adjusting the duration of the line voltage signal in proportion to the value of the line voltage to produce an amplitude adjusted voltage signal, line current sensing means adapted to be connected to the second line and to have a line current signal impressed thereon, a phase adjustment circuit connected to the current sensing means and adjusting the phase of the current signal to produce a phase adjusted current signal, phase responsive means connected to said amplitude adjustment circuit and to said phase adjustment circuit and producing an adjusted power factor signal, and disconnect means connected to said phase responsive means and adapted to disconnect the power lines when the power factor is below a preset value.

4,703,388

OVERVOLTAGE PROTECTION CIRCUIT ARRANGEMENT FOR VEHICULAR ANTISKID BRAKE CONTROL SYSTEMS

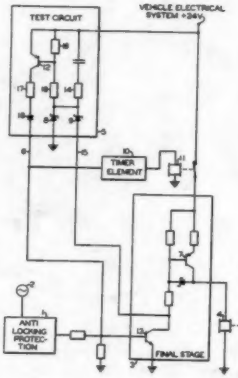
Gerhard Ruhnau, Neustadt, Fed. Rep. of Germany, assignor to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Sep. 23, 1985, Ser. No. 779,329

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1984, 3435055

Int. Cl.[4] H02H *3/20*

U.S. Cl. 361—91 **4 Claims**



1. A circuit arrangement for the protection of a vehicular antiskid electrical control system, and in particular to final stages which have power transistors to protect against overvoltage pulses in an electrical control system, especially an overvoltage condition caused by a load dump situation comprising:

(a) a voltage test circuit having an input which is adapted to sense an overvoltage condition,

(b) said voltage test circuit having an output which is connected to a final stage in such a manner that a power transistor of the final stage is rendered conductive by an overvoltage pulse to dissipate any electromagnetic storage,

(c) said voltage test circuit includes a first Zener diode which becomes conductive when the level of an overvoltage pulse exceeds a first voltage threshold, and

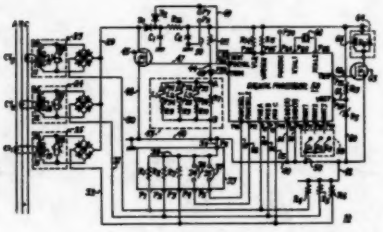
(d) said voltage test circuit includes a second Zener diode which is responsive to an overvoltage condition when it drops below a second threshold, wherein the second voltage threshold is lower than the first voltage threshold.

4,703,389

STATIC TRIP CIRCUIT BREAKER WITH AUTOMATIC CIRCUIT TRIMMING

Graham A. Scott, Avon, Conn., assignor to General Electric Company, New York, N.Y.

Filed Apr. 10, 1986, Ser. No. 849,998
Int. Cl.[4] H02H 3/05
U.S. Cl. 361—93 8 Claims



1. An electronic trip unit for a static strip circuit breaker comprising:

transformer means for sensing electric current within a protected electrical circuit;

signal processor means connected with said transformer means and having an input and an output for determining overcurrent conditions within said protected electric circuit; and

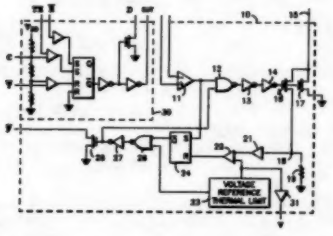
calibration circuit means comprising a resistance network including a first resistor electrically connected in parallel with a plurality of second resistors through a corresponding plurality of switches connected with said signal processor input for adjusting an input signal to said signal processor input in response to a test output signal received at said signal processor output, said second resistors being binary-weighted relative to predetermined values.

4,703,390

INTEGRATED CIRCUIT POWER TIMER

Gary Fay, Scottsdale; Jeffrey G. Mansmann, Chandler, and Keith M. Wellnitz, Scottsdale, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 27, 1986, Ser. No. 866,805
Int. Cl.[4] H02H 3/093, 3/10
U.S. Cl. 361—101 6 Claims



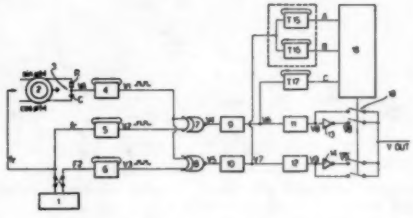
1. An integrated circuit power timer comprising: a power field effect transistor switching means for controllably switching power to a load; a current sensing field effect transistor means used for sensing current flowing through the load; an amplifier for amplifying the sensed current; a first comparator for comparing the amplified sensed current to a reference voltage and providing an output when the amplified sensed current exceeds the reference voltage; a bandgap voltage reference generator for providing the reference voltage; a thermal limit circuit for sensing the temperature of the integrated circuit and providing an output when the temperature exceeds a predetermined value; first logic means coupled to the first comparator and to the thermal limit circuit for providing an inhibiting output when the thermal limit circuit or the first comparator provides an output; a timing circuit for providing a timing signal output; a second comparator for comparing the timing signal output against a predetermined voltage reference and providing an output when the timing signal output is at a predetermined level with respect to the predetermined reference; second logic means for receiving the inhibiting output and the output of the second comparator and providing an output in response to the output of the second comparator in the absence of the inhibiting output; and buffer driver means for providing a driving signal to the power field effect transistor switching means and to the current sensing field effect transistor means in response to the output of the second logic means.

4,703,391

TACHYMETRIC SIMULATION METHOD PROCESSING SIGNALS FROM AN INDUCTIVE POSITION TRANSDUCER AND CIRCUIT FOR CARRYING OUT SAID METHOD

Luciano Franzolini, Milan, Italy, assignor to el.ge Apparecchiature Elettroniche Industriali S.r.l., Italy

Filed Jun. 4, 1984, Ser. No. 616,685
Claims priority, application Italy, Jun. 7, 1983, 21503 A/83
Int. Cl.[4] G01P 3/52
U.S. Cl. 361—240 8 Claims



2. A circuit for tachymetric simulation, comprising an inductive transducer, energized with a single sinusoidal waveform supplied by an oscillator, an RC circuit having resistance and capacitance values selected so that $wRC=1$, wherein $w=2\pi fr$, and fr is the frequency of the oscillator waveform, said RC circuit being connected to receive the output of said transducer to provide at the output of the RC circuit a signal out of phase by an angle proportional to the angle between the moveable part and the fixed or stationary part of the transducer, the output signal from the oscillator and the output signal from the RC circuit comprising a first set of signals, means providing a second set of signals comprising the output signal from the RC circuit and a signal at the same frequency as that provided by the oscillator, but out of phase by a fixed angle, an equivalence sensing circuit connected to sense the equivalence or not-equivalence of the polarity of the signals of said first set and of the signals of said second set, at least one low-pass filtering means with a lower cutting frequency than that of the oscillator, connected to filter the output from said equivalence sensing circuit, a deriving means connected to provide output signals representing the derivatives of the output of said filtering means and at least one inverting means connected invert one of the output signals of said deriving means, and a selector means to provide at the output a tachymetric signal closely correlated to the speed of rotation and to the direction of rotation, but without any discontinuity, from the output signals of said inverting means and said deriving means.

4,703,392

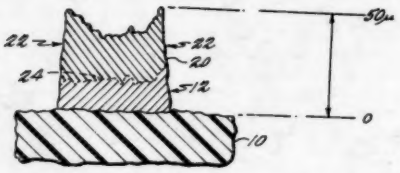
MICROSTRIP LINE AND METHOD FOR FABRICATION

Brian T. Robertson, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Division of Ser. No. 659,503, Oct. 10, 1984, Pat. No. 4,600,663, which is a continuation of Ser. No. 395,336, Jul. 6, 1982, abandoned. This application Nov. 20, 1985, Ser. No. 799,965

Int. Cl.[4] H05K *1/16*

U.S. Cl. 361—402 8 Claims



1. A method for fabricating a microstrip line, comprising the steps of:

(a) providing a substrate;

(b) printing a first glass frit-bonded thick film copper conductive layer of said line on said substrate, said first layer having a predetermined width and a thickness less than the desired thickness of the line; and

(c) printing a second oxide-bonded thick film copper conductive layer over said first layer, said second layer having a width smaller than that of said first layer.

4,703,393

MOUNTING STRUCTURE OF FLAT-LEAD PACKAGE-TYPE ELECTRONIC COMPONENT

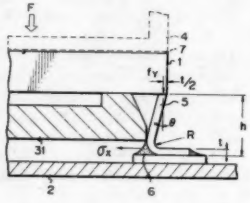
Tsuyoshi Yamamoto, Yokohama; Nobuhide Okada, Kawasaki, and Yasuo Kawamura, Hachioji, all of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Filed Jul. 22, 1985, Ser. No. 757,308

Claims priority, application Japan, Jul. 24, 1984, 59-153403

Int. Cl.[4] H01L *23/02*

U.S. Cl. 361—405 5 Claims



1. A mounting structure of a flat-lead package-type electronic component comprising: lead terminals having ends drawn out from a surface of a package and bent to be horizontal with respect to the plane of the package and other portions of said lead terminal tilted inwardly by a desired angle with respect to the normal of the plane, and a printed wiring board on which said component is arranged and a reinforcement member contacting said lead terminals and provided in a gap formed between said electronic component and said printed wiring board.

4,703,394

SYSTEM FOR INTERCONNECTING ORTHOGONALLY DISPOSED PRINTED CIRCUIT BOARDS AND SWITCHING NETWORKS EMPLOYING SAME

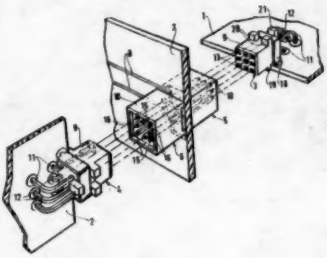
André Petit, Longpont Sur Orge; Etienne Pénicaud, Chaville; Gérard Le Coz, Saint Cheron, and Daniel Jamet, Nozay, all of France, assignors to Alcatel, Paris, France

Filed Oct. 24, 1986, Ser. No. 922,641

Claims priority, application France, Oct. 25, 1985, 85 15893

Int. Cl.[4] H05K *1/14*

U.S. Cl. 361—413 11 Claims



1. System for interconnecting orthogonally disposed printed circuit boards in respective first and second stacks, comprising first contact members disposed on facing edges of said boards in said two stacks assigned to connections between said boards, a mother board disposed perpendicular to said boards between said two stacks, and second contact members disposed on the same facing edges of said boards as said first contact members and defining with said first contact members a series of first multiway plug-in connectors along the respective edge of each board of said first stack and a series of second multiway plug-in connectors along the respective edge of each board of said second stack, wherein said mother board comprises a distribution network in the form of an array of conductive tracks assigned to distributing signals to said boards and third, connecting contact members and fourth, distribution contact members connected to said distribution network, disposed transversely to said mother board and defining on one side thereof a set of third multiway plug-in connectors having said first connectors plugged into them and on the other side thereof a set of fourth multiway plug-in connectors having said second connectors plugged into them and interconnecting said first contact members of corresponding first and second connectors via said connecting contact members and connecting said second contact members of each board to said distribution network via said distribution contact members.

4,703,395

BREADBOARD PANEL CONSTRUCTION FOR ELECTRONIC CIRCUITRY

Thomas L. Cline, Hanover, Pa., assignor to Corra-Board Products Co., Inc., Hanover, Pa.

Filed Sep. 26, 1986, Ser. No. 911,726

Int. Cl.[4] H05K *7/02*

U.S. Cl. 361—417 1 Claim

1. A breadboard panel construction (**50**) in combination with an electrical circuit component (**90**) having plural legs (**91, 92**) depending therefrom,

said breadboard panel construction (**50**) having plural aperture means (**80**) formed therein for receipt of said circuit component legs (**91,92**),

said breadboard panel (**50**) having an overlayer (**51**) comprised of chipboard material having relatively shorter fiber lengths (**60**) contained therein,

said breadboard panel having an underlayer (**52**) comprised of chipboard material having relatively shorter fiber lengths (**60**) contained therein,

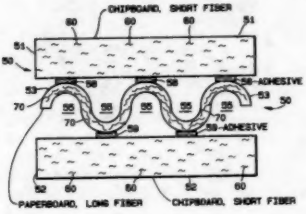
said breadboard panel further having an undulating mid-

stratum layer (53) between said overlayer (51) and underlayer (52),

wherein upper undulation portions of said midstratum layer (53) are secured to said overlayer (51) by adhesive means (58),

and wherein lower undulation portions of said midstratum layer (53) are secured to said underlayer (52) by adhesive means (59),

said breadboard panel construction providing means wherein air cells (55) are formed internally thereof such that a given breadboard panel thickness may be maintained while reducing the number of chipboard layers required for construction,



wherein said undulating midstratum layer (53) has relatively longer fiber lengths (70) contained therein as compared to the relatively shorter fiber lengths (60) contained in said overlayer (51) and said underlayer (52),

wherein the average fiber length (60) of said overlayer (51) and said underlayer (52) is two millimeters of less,

wherein the average fiber length (70) of said undulating midstratum layer (53) is five millimeters or more,

wherein said air cells (55) are formed between said overlayer (51) and said underlayer (52) by way of said undulating midstratum layer (53) such that the overall weight of a panel (50) is reduced while improving panel strength via the spring-like effect of said midstratum layer and by the relatively longer fiber lengths (70) contained in said midstratum layer.

4,703,396

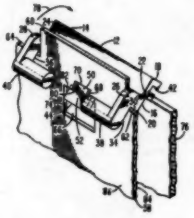
LATCH FOR PRINTED CIRCUIT BOARD

James D. Fletcher, Lititz, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Oct. 30, 1986, Ser. No. 924,779

Int. Cl.[4] H05K *07/12*

U.S. Cl. 361—419 **16 Claims**



1. A latch for securing a printed circuit board adjacent a structure comprising:

a body having two major opposing surfaces adjoining a first portion, a second portion opposite said first portion, and two additional portions of said body opposite each other between said first and second portions, each additional portion including an L-shaped arm having one segment integrally connected to the second portion of said body so as to project away from one major surface of said body, the other segment of each arm extending away from the first portion of said body along a direction substantially parallel to said one major surface,

means disposed adjacent to the first portion of said body along the major surface opposite said one surface for receiving an edge of said printed circuit board, and

a T-shaped tongue having a stem integrally connected at one end thereof to the second portion of said body so as to project away from said second portion along a direction substantially parallel to said major surfaces, the other end of said stem adjoining a crossbar disposed along a direction substantially orthogonal to said stem.

4,703,397

FUNCTION CIRCUIT INCORPORATING TYPE WIRING DEVICE FOR AUTOMOBILE

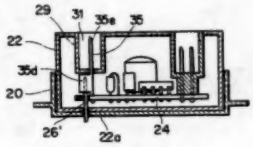
Takayoshi Minoura, Kosai, and Kikuo Ogawa, Haibara, both of Japan, assignors to Yazaki Corporation, Japan

Filed Sep. 12, 1986, Ser. No. 907,147

Claims priority, application Japan, Sep. 12, 1985, 60-200592

Int. Cl.[4] H02B *1/04*

U.S. Cl. 361—428 **13 Claims**



1. In a function circuit incorporating type wiring device for an automobile, including a junction block employed for an electric wiring in the automobile, and an electronic unit pack detachably connected to said junction block, said electronic unit pack being provided with a case, a printed board incorporated in said case and forming a function circuit for effecting connection of a signal between wire harnesses, a junction block connector formed on an outer periphery of said case, and an external connector formed on the outer periphery of said case; the improvement comprising at least one tabular connection terminal led from said junction block into said junction block connector of said electronic unit pack and projected into said external connector of said electronic unit pack to form a through circuit, said tabular connection terminals being connected with a part of said function circuit on said printed board as required.

4,703,398

AUXILIARY BRAKE LIGHT FOR MOTOR VEHICLES

Lothar Huth, Boeblingen; Horst Dahm, Ostelsheim; Goetz Moetting, Boeblingen, and Fritz Haeberle, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 29, 1986, Ser. No. 924,336

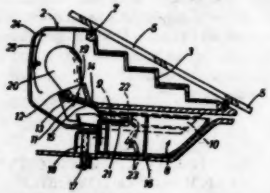
Claims priority, application Fed. Rep. of Germany, Oct. 29, 1985, 3538361

Int. Cl.[4] B60Q *1/44*

U.S. Cl. 362—61 **7 Claims**

1. An auxiliary brake light for motor vehicles, comprising socket means preassemblable securely near a rear window on a body part, a light housing means mountable pivotally on the socket means, and seal means for avoiding stray-light by sealing the light exit surface of the light housing means with respect to the rear window, one of socket and light housing means including two oppositely disposed guide channels extending substantially in the vehicle longitudinal direction in which guide bolts protruding from the other of the socket and light housing means are displaceably and rotatably guided, at least one springy tongue means projecting from one of socket

and light housing means which during assembly is supported with prestress at a counter-surface of the other of said socket and light housing means, the counter surface and the surface of the tongue means facing the same being provided with grooves



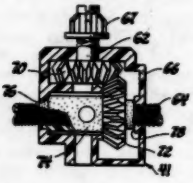
forming teeth and extending transversely to the displacement direction, and the side of the light housing means facing the rear window being matched in its course to the inclination of the rear window and being provided along its circumference with a soft rubber seal forming part of the seal means.

4,703,399

VEHICLE HEADLAMP ASSEMBLY

Paul D. Van Duyn, and John D. Geddie, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 16, 1986, Ser. No. 886,148
Int. Cl.[4] F21V *3/18*
U.S. Cl. 362—66 **1 Claim**



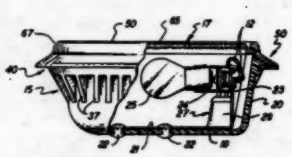
1. In combination with a vehicle headlamp assembly having a lamp body received between frame walls of a support frame and including pivot means on said frame walls and said lamp body aligned on an aiming axis about which said lamp body is adapted for rotatable adjustment relative to said frame, adjustment means located at one end of said lamp body for adjustably positioning said lamp body about said aiming axis, said adjustment means including a generally vertically orientated drive shaft having one end thereof provided with a head and rotatably journaled on said support frame above said lamp body, a housing rotatably supporting the other end of said drive shaft, a first bevel gear fixed with said other end of said drive shaft, a drive nut supported for rotation within said housing about an axis substantially normal to the axis of rotation of said drive shaft, a second bevel gear fixed to one end of said drive nut and having the teeth thereof meshing with said first bevel gear on said drive shaft, a threaded shaft extending through said drive nut and through both the forward end and the rear end of said housing and having the threads thereof engaging the internal threads of said drive nut, and one end of said threaded shaft nonrotatably connected directly to said one end of said lamp body whereby rotation of said drive shaft causes said first bevel gear to rotate said second bevel gear which in turn rotates said drive nut so as to cause longitudinal movement of said threaded shaft and adjustable positioning of said lamp body about said vertical axis.

4,703,400

SHOCK RESISTANT VEHICULAR LAMP

Donald W. Vescio, Fulton, and Daniel S. Latham, North Syracuse, both of N.Y., assignors to R. E. Dietz Co., Syracuse, N.Y.

Filed Jul. 24, 1986, Ser. No. 888,744
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 362—80 **10 Claims**



1. A shock resistant lamp that is capable of being snapped into locking contact with the rim of a receiving opening formed in a body panel of a vehicle that includes

an open topped housing formed of a resilient material having a horizontal bottom wall and vertically disposed side walls,

said housing having an expanded section about the side wall that compliments and is slightly larger than the opening in the body panel and having a first outer groove formed thereabout for accepting the rim of said panel opening therein, said outer groove being located a predetermined distance below the top surface of the housing,

said housing further including a second inside groove formed about the inner periphery of the housing for containing a lens therein whereby the lens closes the housing, said second groove being positioned above the first groove a vertical distance that is sufficient so that the top of the housing can be deformed to release the lens without removing the housing from the panel, and

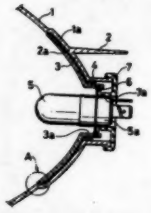
illumination means secured to an inside wall of said housing beneath the lens.

4,703,401

HEAD LAMP FOR AUTOMOBILES

Takeo Ichihara, Hatano; Shuichi Watanabe, Yamato; Takashi Futami, Tokyo, and Nobutaka Oda, Yokohama, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Dec. 11, 1986, Ser. No. 940,542
Claims priority, application Japan, Dec. 23, 1985, 60-197924[U]
Int. Cl.[4] F21V *7/20*
U.S. Cl. 362—80 **12 Claims**



1. A head lamp for an automobile, comprising:

a main reflector made of a synthetic resin;

a bulb mounted substantially at the center of said main reflector;

an auxiliary reflector integrally connected to said main reflector and arranged in the center portion of said main reflector and encircling said bulb;

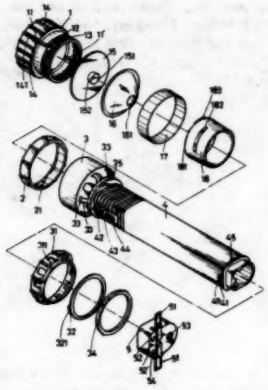
said auxiliary reflector being smaller than said main reflector and being made of heat-resisting synthetic resin which is more heat-resisting than the resin from which said main reflector is made.

4,703,402

FLASH LIGHT WITH ALARM AND RESCUER

Webert Hsieh, Room 4, 12th Fl., No. 342, Fu Shin S. Road, Sec. 1 Taipei, Taiwan

Filed Jul. 24, 1986, Ser. No. 889,077
Int. Cl.[4] A45B *3/02*; A63B *15/02*
U.S. Cl. 362—102 **6 Claims**



1. A flashlight with alarm and rescuer which will selectively blink an alarm signal, sound an alarm, and deliver an electrical shock comprising:

a cylindrical casing; a transparent hood surrounding an end of said casing and having a plurality of circumferential openings therethrough;

a colored reflector ring, with a reflector, bulb mounted therein and a lens mounted thereover, said ring, reflector, bulb and lens being disposed within said hood at the end of said casing, and flasher means within said casing coupled to said bulb;

a plurality of biased electrodes, one slidably disposed in each opening in said hood;

first rotatable regulator means surrounding said hood for selectively extending said electrodes through said openings and for retracting said electrodes into said hood, said electrodes being adapted to be charged with an electric current only when depressed in the extended position;

said casing defining a resonance chamber disposed behind said reflector and bulb, adapted to contain an alarm, and sound speaker; and second rotatable means, surrounding said casing for selectively controlling the volume of said alarm;

switch means for selectively delivering an electric current to said flasher, said electrodes, and said alarm.

4,703,403

POST TOP LUMINAIRE

Donald C. Smith, Auburn; Richard F. Snow, Manlius, and George B. Pauli, Chittenango, all of N.Y., assignors to Crouse-Hinds Company, Syracuse, N.Y.

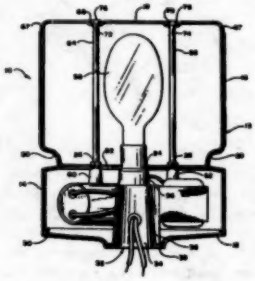
Filed Feb. 25, 1982, Ser. No. 352,129
Int. Cl.[4] F21V *3/00*
U.S. Cl. 362—268 **23 Claims**

1. A luminaire adapted to be mounted at the top of a post and to direct light below a horizontal plane, said luminaire comprising:

a base having a mounting means for mounting said luminaire above an area to be lighted:

an electrical means positioned on said base to operate a lamp;

a unitary housing element received on said base, said housing element having upper and lower portions of generally cylindrical shape with an intermediate interior insulator panel intersecting the housing element sides to form a



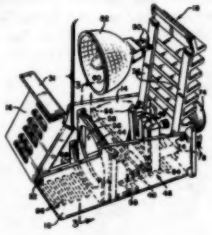
substantially H-shaped crosssection, the lower cylindrical portion enclosing said electrical means and the upper cylindrical portion forming a light refractor means for said lamp, the light refractor means comprising an interior longitudinally disposed prism means and exterior prism means adapted to direct light below the horizontal plane defined by the top of the unitary housing element; and a cover enclosing the top of said housing element.

4,703,404

PORTABLE LIGHTING DEVICE

Charles J. Helton, III, Camarillo, Calif., and George N. Panagiotou, 5723 Auckland Ave., North Hollywood, Calif. 91601, assignors to George N. Panagiotou, North Hollywood, Calif.

Filed Feb. 17, 1981, Ser. No. 234,945
Int. Cl.[4] F21V *29/00*
U.S. Cl. 362—294 **12 Claims**



1. An electric portable lamp comprising

a housing having an open front end and an open top which is closable by first and second members each of which are hinged to upper opposing end portions of said housing whereby the free ends of said members are adjacent each other when closed over the housing top;

a bulb mounting assembly positioned within said housing having a bulb mounted therein directed toward the housing open front end, said assembly including a bottom frame secured to said housing supporting an electric contact means for supplying electric power to said bulb; and,

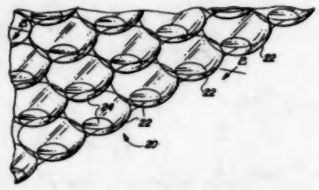
a plate secured within said housing having an aperture aligned with said housing front end.

4,703,405

GLARE REDUCING LENS

Ian Lewin, 11408 St. Andrew's Way, Scottsdale, Ariz. 85254

Filed Jul. 17, 1986, Ser. No. 886,650
Int. Cl.[4] F21V 9/00
U.S. Cl. 362—333 15 Claims



1. A refractive lens member with improved lamp hiding characteristics for use with a luminaire having a light source including in combination:

a plurality of individual transparent lenses arranged in a network, each lens having a substantially flat light incident surface located in the same plane and each having a substantially convex section light emergent surface in all planes perpendicular to the plane of said light incident surfaces:

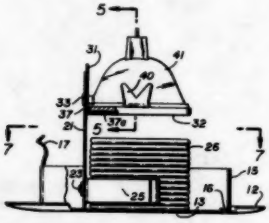
a transparent prism network extending above the plane of said light incident surfaces and interconnecting said lenses into a network grid, said prism network comprising upwardly-extending outwardly-diverging wall sections commencing on the outer edge of each of said light incident surfaces of said lenses and terminating above the plane of the incident surfaces of said lenses, said prism network cooperating with said lenses to prevent incident light generated by said light source from exiting through said emergent surfaces of said lenses at angles greater than a predetermined angle from a line perpendicular to said substantially flat incident surfaces of said lenses.

4,703,406

ONE PIECE LAMP MOUNTING FOR RECESSED LIGHT FIXTURES

Franklin E. Elliott, and Anatoly Kudishevich, both of Los Angeles, Calif., assignors to Capri Lighting, Calif.

Filed Sep. 24, 1986, Ser. No. 911,014
Int. Cl.[4] F21S 1/06
U.S. Cl. 362—365 4 Claims



1. A one-piece lamp mounting for attachment to a trim structure having a base provided with an illumination opening and with means adjacent said opening for supporting a lamp mounting comprising:

a planar main portion having
an illumination aperture,

means for removably retaining a translucent plate in a position overlying said aperture including
circumferentially disposed edges of said main portion extending at a right angle to the plane of said main portion,

and

means for retaining a lamp in a position over said aperture, either in direct contact with said main portion or with said translucent plate interposed, including

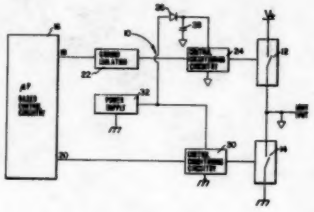
a plurality of resilient tabs integral with said edges and extending inwardly beyond the edge of said aperture.

4,703,407

POWER SUPPLY FOR TOTEM POLE POWER SWITCHES

John J. Fry, Wickliffe; Edward Bastijanic, Concord, and John W. Robertson, Jr., Chesterland, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Nov. 26, 1986, Ser. No. 935,351
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—16 8 Claims



1. A system for supplying power to switches arranged in a totem pole circuit configuration comprising:

a power source electrially connected to a first switch and to a second switch arranged in a totem pole circuit configuration;

energy storage means electrically connected to the first switch and said power source; and

means for controlling periodic operation of the first switch and the second switch resulting in periodic charging and discharging of said energy storage means and periodic application of a predetermined voltage at the output of the first switch and the second switch.

4,703,408

APPARATUS AND RECORD CARRIER FOR OPTICALLY WRITING INFORMATION

Seiji Yonezawa; Yasunori Kanazawa, both of Hachiouji, and Toshiaki Tsuyoshi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Maxell Ltd., Osaka, both of, Japan

Filed Nov. 26, 1984, Ser. No. 674,672
Claims priority, application Japan, Nov. 28, 1983, 58-222076; Dec. 16, 1983, 58-236319; Apr. 6, 1984, 59-67756; Jul. 31, 1984, 59-158646
Int. Cl.[4] G11B 21/10
U.S. Cl. 369—44 20 Claims

1. An apparatus comprising:

a record carrier having a circular disc-shaped substrate provided thereon with a recording layer capable of optically writing information therein and in which a plurality of circumferential reference tracks extending in a rotating direction of said record carrier are disposed at radial intervals, each of said reference tracks being constructed into an optically detectable structure so as to function as an optical guide for enabling recording of information at least between adjacent reference tracks;

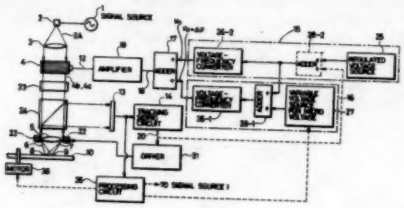
an objective lens for condensing first and second light beans and for focusing said first and second light beams on said recording layer of said record carrier respectively;

optical detection means for detecting an intensity of said first light beam from said recording layer;

means for deriving from the output of said optical detection means a tracking signal for controlling impingement positions of both said first and second light beams in a direction traversing the track direction;

tracking means for causing said first light beam to follow one of said reference tracks in response to the tracking signal;

light diffraction means for moving said second light beam on said recording layer of said record carrier in the radial direction thereof, said light diffraction means including an acousto-optic diffracter, first oscillation means for generating an output signal corresponding to a first frequency which varies by a predetermined frequency corresponding to a predetermined pitch each time said record carrier



performs one revolution, and driving means for supplying the output signal of said first oscillation means to said acousto-optic diffracter so that said acousto-optic diffracter moves said second light beam to vary the interval between said first and second light beams on said recording layer by said predetermined pitch each time said record carrier performs one revolution while said first light beam follows one of said reference tracks; and

means to modulate the intensity of said second light beam in response to information to be recorded so that said second light beam writes information as information tracks between said reference tracks while one of said reference tracks is followed by said first light beam, said information tracks having radial intervals of said predetermined pitch therebetween.

4,703,409

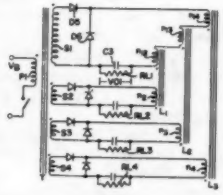
COUPLED POWER SUPPLY INDUCTORS FOR REDUCED RIPPLE CURRENT

James H. Spreen, Stone Ridge, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 792,250, Oct. 30, 1985, abandoned, which is a continuation of Ser. No. 536,081, Sep. 26, 1983, abandoned. This application Oct. 30, 1986, Ser. No. 925,032

Int. Cl.[4] H02M *1/14*

U.S. Cl. 363—45 **34 Claims**



21. A power supply circuit with reduced ripple current for producing a first output and a second output comprising:

a voltage source;

a transformer having a primary input coil, a first secondary output coil for providing a first input voltage and a second secondary output coil for providing a second input voltage, said primary input coil being connected to said voltage source;

a first diode connected to said first secondary output coil for rectifying said first input voltage;

a second diode connected to said second secondary output coil for rectifying said second input voltage;

a first filter means connected to said first secondary output coil through said first diode for filtering said first input voltage, said first filter means including a first inductor; and a second filter means connected to said second secondary output coil through said second diode for filtering said second input voltage, said second filter means including a second inductor magnetically coupled to said first inductor, the parameters of said inductors being chosen such that Tau is other than unity, where $Tau = V_2/V_1\sqrt{L_1/L_2}$ and L_1 and L_2 are the self-inductances of the respective first and second coupled inductors and V_1 and V_2 are the respective first and second input voltages, said ripple current through said second inductor being much lower than said ripple current through said first inductor.

4,703,410

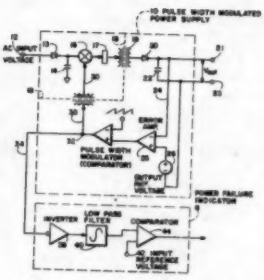
POWER FAILURE INDICATOR

Steven H. Pepper, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 7, 1986, Ser. No. 848,660

Int. Cl.[4] H02H *7/12*

U.S. Cl. 363—56 **7 Claims**



1. In a pulse width modulated power supply controlled by a pulse width modulated signal having a time varying voltage, a power failure indicator circuit comprising:

averaging means for averaging the time varying voltage of the pulse width modulated signal to produce an averaged signal voltage;

an input reference voltage source for providing a reference voltage corresponding to a predetermined proportion of a maximum average voltage of the pulse width modulated signal; and

comparator means for comparing the averaged signal voltage to the reference voltage to determine if the averaged signal voltage level has crossed the reference voltage level and generating in response to such a determination an output signal warning of power failure of the power supply.

4,703,411

VOLTAGE CONVERTER WITH GTO THYRISTORS IN SERIES CONNECTION WITH AT LEAST A CHOKE WITH FREEWHEELING CIRCUIT

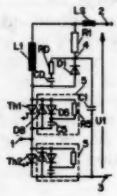
Stefan Umbricht, Wettingen, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jul. 16, 1986, Ser. No. 886,168

Claims priority, application Switzerland, Jul. 26, 1985, 3250/85

Int. Cl.[4] H02H 7/122

U.S. Cl. 363—57 10 Claims



1. A voltage converter comprising:

first and second direct-voltage connections carrying opposite potential, and an alternating voltage connection;

at least two series-connected gate turn-off thyristors;

at least one current limiting reactor connected in series with said thyristors between said first and second direct-voltage connections;

a reactor free-wheeling diode provided in a parallel branch to each current limiting reactor;

a resistor serving as a reactor free-wheeling resistor connected in series with each reactor freewheeling diode;

an overvoltage capacitor having a first terminal coupled to a connecting point of the reactor free-wheeling resistor and the reactor free-wheeling diode and a second terminal coupled to the second directvoltage connection.

4,703,412

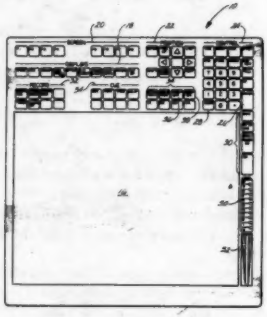
PORTABLE CONTROL UNIT FOR THEATER, TELEVISION, AND FILM LIGHTING CONTROL SYSTEMS

David W. Cunningham, Los Angeles, and Gregory F. Esakoff, Huntington Harbor, both of Calif., assignors to Lee Colortran, Inc., Burbank, Calif.

Filed Sep. 13, 1985, Ser. No. 775,795

Int. Cl.[4] G06F 3/00

U.S. Cl. 364—140 8 Claims



8. Apparatus for controlling theater, television and film lighting comprising:

a digitizer tablet;

a microprocessor-controlled lighting control console having a keyboard and at least one level-setting control device;

an overlay for placement on the digitizer tablet, said overlay having lighting control indicia and an open active area display thereon, said indicia simulating the keyboard of said lighting control console, said overlay including a level-setting scale and a slot simulating said level-setting control device;

said open active area of the overlay being of a predetermined size for receiving a graphic illustration containing symbols representing a lighting control plan for an area of a theater, television, or film stage area to be subjected to controlled lighting;

control means for operative engagement with the tablet for selecting desired points of the indicia and active area of said overlay;

connector means for interconnecting the tablet and the console;

programming means in the microprocessor for controlling the lighting control console and digitizer tablet; and

data display means operatively connected to the lighting control console to display the data input into the apparatus at the tablet or the lighting control console.

4,703,413

METHOD AND APPARATUS FOR MODIFICATION OF A SINGLE BIT IN A BIT-ADDRESSABLE COMPUTER SYSTEM

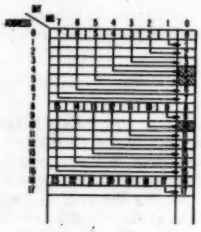
Hiroshi Hashimoto, Tama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 341,586, Jan. 21, 1982, abandoned. This application Sep. 19, 1985, Ser. No. 777,578

Claims priority, application Japan, Apr. 9, 1981, 56-53385

Int. Cl.[4] G06F 9/00

U.S. Cl. 364—147 7 Claims



1. In an industrial process controller with sequence control, a bit-addressable word word-organized memory system for writing a write data bit into a desired bit location of said word being identified in a first field of an address input to said memory system and said desired bit location being identified in a second field of said address, said memory system:

means for retrieving said word form said memory system using said first field;

buffer means, coupled to said retrieving means, for temporarily storing said retrieved word;

means, coupled to said buffer means for creating a word consisting of all of the bits of said retrieved word, except for the bit in said desired bit location;

means, coupled to said creating means, for entering said write data bit into said desired bit location of said created word;

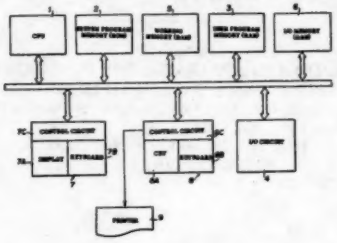
means for writing said created word with said entered data bit into said retrieving means.

4,703,414

PROGRAMMABLE CONTROLLER

Tadashi Inoue, Ohyamazaki, and Tosimi Matsuura, Tanabe, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jun. 7, 1985, Ser. No. 742,308
Claims priority, application Japan, Jun. 7, 1984, 59-117253
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—147 1 Claim



1. A programmable controller, comprising:
a programmable console comprising a keyboard having a special key;
a user program memory;
a retrieval means for retrieving the contents of said user program memory in response to the operation of said special key provided in said keyboard;
a first command extracting means for extracting a series of user commands relating to whether execution conditions for an interlock command are met or not when the interlock command is detected by the action of said retrieval means;
a first memory means for storing the interlock command and said series of user commands;
a second command extracting means for, during the time between the detection of the interlock command and the detection of a corresponding interlock clear command by the action of said retrieval means, extracting all the specific user commands from the group of user commands interposed between the interlock command and the interlock clear command;
a second memory means for storing the specific user commands with their addresses;
means for outputting the interlock command and the series of the user commands stored in said first memory means; and
an output processing means for outputting the specific user commands and their addresses stored in said second memory means.

4,703,415

METHOD OF APPROACH IN AREA CUTTING

Hajimu Kishi; Masaki Seki; Takashi Takegahara, and Yasushi Onishi, all of Tokyo, Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP84/00483, § 371 Date Jun. 10, 1985, § 102(e) Date Jun. 10, 1985, PCT Pub. No. WO85/01682, PCT Pub. Date Apr. 25, 1985
PCT Filed Oct. 12, 1984, Ser. No. 746,034
Claims priority, application Japan, Oct. 15, 1983, 58-193032
Int. Cl.[4] G05B *13/04*
U.S. Cl. 364—170 5 Claims

1. A method of approach in area cutting for cutting the interior of an area bounded by a curve of an external shape, comprising the steps of:
(a) storing in memory an angle θ between a workpiece plane and a straight line connecting an approach starting point and a cutting starting point, and storing in memory a distance dz between the approach starting point and the cutting starting point in a direction perpendicular to the workpiece plane;
(b) calculating coordinate values for the approach starting point using the angle θ and the distance dz, so that the direction of a projection of the straight line on the workpiece plane coincides with a direction of a normal line which is normal to the curve of the external shape at the cutting starting point; and

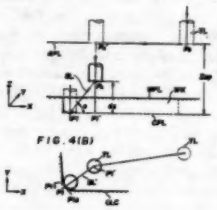


FIG. 4(B)

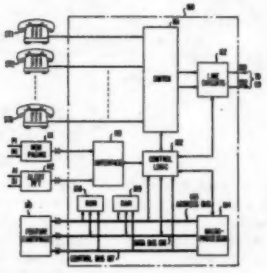
(c) positioning a tool at the approach starting point;
(d) automatically moving the tool to the cutting starting point in a cutting feed mode by moving the tool obliquely with respect to the workpiece in a direction defined by the entered angle data and thereafter starting cutting in the interior of the area bounded by the curve of the external shape.

4,703,416

APPARATUS FOR LOCATING PROGRAMS RESIDENT ON A CARTRIDGE OF A CARTRIDGE PROGRAMMABLE COMMUNICATION SYSTEM

Joseph A. Crupi, Eatontown; David J. Hayward, Lincroft, and David F. Jones, Middletown, all of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation of Ser. No. 448,739, Dec. 10, 1982, abandoned.
This application Sep. 19, 1985, Ser. No. 777,515
Int. Cl.[4] G06F *12/06*
U.S. Cl. 364—200 9 Claims



1. A programmed controller of a communication system for controlling communication between a plurality of communication lines in response to instruction sets located on memories, said controller executing each instruction set to perform a predetermined communication function, said controller comprising
a first memory including
a first group of instruction sets, each of said instruction sets extending from a starting address;
one of a plurality of interchangeable second memories, each second memory including
a second group of instruction sets, each of said second group

of instruction sets extending from a starting address which is not the same for all of said second memories,

an address table for storing in a fixed order the starting addresses of each of said second group of instruction sets, the address table within each said second memory not being located at an address which is the same for each of said plurality of second memories,

a table entry index for accessing a particular instruction set starting address within the address table, and

interface program means located at a common address within each of said second memories for instructing said controller therefrom, said interface program means including the address of said address table and said starting address of said first group of instruction sets and responsive to a program call including an identifier for selecting said table entry index for either locating in said first memory the starting address of a particular instruction set or locating in said second memory the starting address of a particular instruction set using said address table and said table entry index selected using said identifier; and

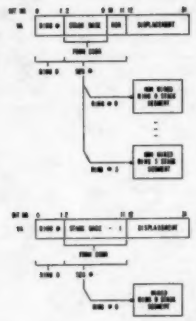
said first memory further including interface calling means for generating said program call to said interface program means at said common address, said program call including said identifier.

4,703,417

CALL INSTRUCTION FOR RING CROSSING ARCHITECTURE

Victor M. Morganti, Lincoln, and Patrick E. Prange, Brookline, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jun. 27, 1985, Ser. No. 749,245
Int. Cl.[4] G06F *9/06*
U.S. Cl. 364—200 **2 Claims**



1. A memory stack arrangement used in a multiprocessing-/multiprogramming computer system having a ring architecture comprised of at least four rings numbered 0-3 with the innermost ring being assigned an identity of 0 and the ring being assigned an identity of 3, and with the innermost ring being the highest level of privilege, a plurality of processors for executing procedures thereon, a software operating system for supervising/scheduling the execution of the procedures, each procedure and the software operating system having a predetermined level of privilege, each of said procedures for executing at its predetermined level of privilege, said memory stack arrangement being organized to implement an operation with said ring architecture wherein a procedure executing at a lower level of privilege can execute at a higher level of privilege, said memory stack arrangement comprising:

a wired memory stack segment assigned to the highest priority one of said rings wherein the operating system cannot tolerate page faults;

a plurality of non-wired memory stack segments, one of said non-wired stack segments being assigned to each of said rings; and

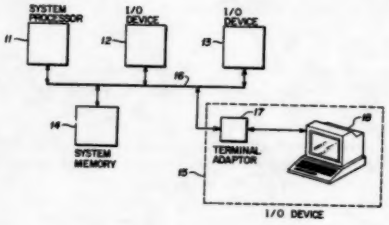
wherein each of said wired and non-wired memory stack segments store the ring number of the ring to which they are assigned, a request from a higher priority ring to a lower priority ring to process a procedure request is always granted and requests from lower priority rings to higher priority rings are normally blocked, but under special conditions a request from a lower priority ring to a higher priority ring is granted.

4,703,418

METHOD AND APPARATUS FOR PERFORMING VARIABLE LENGTH DATA READ TRANSACTIONS

David V. James, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 28, 1985, Ser. No. 750,377
Int. Cl.[4] G06F *9/34*
U.S. Cl. 364—200 **5 Claims**



1. A method for receiving input from a input/output device comprising:

providing a plurality of consecutive memory locations for receiving data from the input/output device;

providing to the input/output device an address of at least one of the plurality of memory locations;

providing to the input/output device a count which specifies how many memory locations are in the plurality of memory locations;

providing a command to the input/output device to terminate transfer of data to the plurality of memory locations; and,

receiving information as to how many of the plurality of consecutive memory locations received data from the input/output device.

4,703,419

SWITCHCOVER MEANS AND METHOD FOR DUAL MODE MICROPROCESSOR SYSTEM

Charles A. Krause, Stevensville; Babu Rajaram, St. Joseph, and Barry A. Watzman, Benton Harbor, all of Mich., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation of Ser. No. 444,758, Nov. 26, 1982, abandoned. This application Jul. 24, 1986, Ser. No. 886,956
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 **7 Claims**

1. In a multiprocessor data handling system including an input/output device, a common memory unit and a bus coupled to said common memory unit and said input/output device, wherein system control is exercised successively by each of a plurality of processors, an arrangement for alternately transferring control of said system between processors therein comprising:

a first operating processor coupled to said bus and exercising control over said system and having a first program stored therein for transferring program status data and instructions between said common memory unit and said first processor;

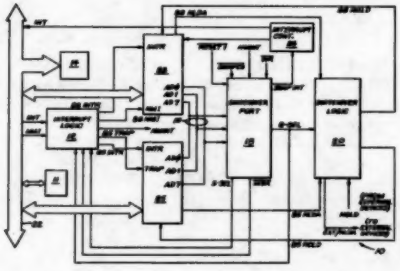
a second idle processor coupled to said bus and having a

second program stored therein for transferring program status data and instructions between said common memory unit and said second processor;

first means coupled to said bus and to said first operating and second idle processors and responsive to an interrupt signal from said input/output device for generating a processor select signal;

interrupt blanking means within said first means coupled to said second idle processor for rendering said second idle processor insensitive to an interrupt signal from said bus;

second means coupled to said processors and to the bus and responsive to said select signal for generating a swap interrupt signal and a first operate signal in response thereto and providing said first operate signal to said second idle processor in initiating operation of said second idle processor;



a programmable interrupt controller coupled to said second means and responsive to said swap interrupt signal for providing a second address-coded operate signal to the bus and thence to said second processor via said first means for initiating the operation of said second processor at a desired location in the second program stored therein; and

third means coupled to said first and second processors and to said bus and said second means and responsive to a hold signal and said first operate signal respectively output by said bus and by said second means for providing said hold signal to said first operating processor in rendering said first operating processor in an idle condition prior to initiation of operation of said second idle processor.

4,703,420

SYSTEM FOR ARBITRATING USE OF I/O BUS BY CO-PROCESSOR AND HIGHER PRIORITY I/O UNITS IN WHICH CO-PROCESSOR AUTOMATICALLY REQUEST BUS ACCESS IN ANTICIPATION OF NEED

John W. Irwin, Georgetown, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1985, Ser. No. 706,804

Int. Cl.[4] G06F *13/18*

U.S. Cl. 364—200 **7 Claims**

1. A data processing system comprising in combination

(a) a Central Processing Unit (CPU)

(b) a memory subsystem connected in data transferring relationship to said CPU, and

(c) an Input/Output (I/O) subsystem connected in data transferring relationship with said CPU and said memory subsystem, said I/O subsystem comprising

(1) an I/O Channel Controller (IOCC),

(2) an I/O Bus connected to said IOCC,

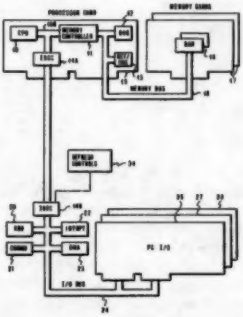
(3) a plurality of Input/Output (I/O) units each of which is selectively connectable in a data transferring relationship to said I/O Bus and each of which includes means for generating an access request signal when said unit requires access to said I/O bus, and

(4) a Co-Processor which is selectively connectable in a data transferring relationship to said I/O Bus, said Co-processor having,

(a) a separate clock for asynchronously clocking an instruction fetch cycle for transferring an instruction stored in said memory subsystem to said co-processor through said bus, and

(b) means for automatically requesting access to said I/O bus for said co-processor a predetermined time, measured by said separate clock, after said coprocessor relinquishes access of said bus whether or not said co-processor needs said bus, including means for developing a two level signal and means for switching from a first level to a second level at said predetermined time.

(5) said IOCC including,



(a) arbiter means for controlling access to said I/O Bus by said co-processor and I/O units in accordance with a preestablished priority plan, said arbiter means including

(i) circuit means connected to receive said two level signal and operable in repsonse to said second level to grant said Co-processor access to said I/O bus provided none of said other I/O units are requesting access to said I/O bus, said circuit means also connected to receive said access request signals from said I/O units and operable in response to receiving one said access request signal to cause said Co-processor to immediately return said two level signal to said other level whereby said co-processor relinquishes access of said I/O bus immediately if the co-processor is not using said I/O bus or at the termination of the current instruction fetch cycle if the Co-processor is then using said bus.

4,703,421

READY LINE SYNCHRONIZATION CIRCUIT FOR USE IN A DUPLICATED COMPUTER SYSTEM

Robert J. Abrant, Villa Park, Ill.; Michael D. Martys, Pittsfield, Mass., and George K. Tarleton, Itasca, Ill., assignors to GTE Communication Systems Corporation, Northlake, Ill.

Filed Jan. 3, 1986, Ser. No. 815,976

Int. Cl.[4] G06F *15/16, 11/00*; G05B *15/08, 19/18*

U.S. Cl. 364—200 **23 Claims**

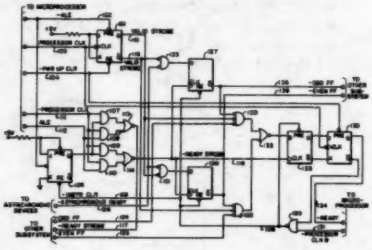
1. A synchronization circuit for use in a computer system including duplicated microprocessors, duplicated subsystems and duplicated synchronization circuits configured in a master-slave arrangement each synchronization circuit being connected with one of said microprocessors and one of said subsystems, said microprocessors being operated to provide clock pulses and periodic instruction status signals, and said subsystems being operated to provide an asynchronous ready signal, said synchronization circuit comprising:

clock pulse storage means connected to said associated

microprocessor and operated in response to said clock pulses to provide divided clock pulses;

status signal storage means connected to said associated microprocessor and operated in response to said status signal to provide a stored status signal;

asynchronous ready signal storage means connected to said associated subsystem, said clock pulse storage means and said status signal storage means, and operated in response to said asynchronous ready signal, one of said divided clock pulses and one of said stored status signals from the same synchronization circuit when operated as a master



synchronization circuit, or from the master synchronization circuit when operated as a slave synchronization circuit, to provide a stored asynchronous ready signal; and

synchronization means connected to the other synchronization circuit, said clock pulse storage means, the said status signal storage means and said asynchronous ready signal storage means and operated in response to one of said divided clock pulses, one of said stored status signals and said stored asynchronous ready signal from said asynchronous ready signal storage means in both the same and the duplicated synchronization circuits to provide a synchronized ready signal.

4,703,422

MEMORY HIERARCHY CONTROL METHOD WITH REPLACEMENT BASED ON REQUEST FREQUENCY

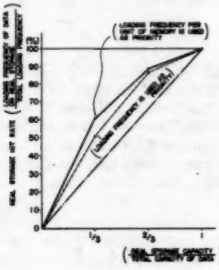
Toshiyuki Kinoshita, Sagamihara; Toshiaki Arai, Yokohama; Takao Sato, Kawasaki; Takashige Kubo, Hachioji; Yasufumi Yoshizawa, Tachikawa, and Hiromichi Mori, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 28, 1984, Ser. No. 687,160

Claims priority, application Japan, Dec. 28, 1983, 58-246284

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—200 **13 Claims**



1. A memory hierarchy control method for a memory hierarchy system having two or more hierarchy storages of different access speeds, wherein the programs and/or data to be loaded in said hierarchy storages are characterized according to their priority, said method comprising the steps of:

monitoring and recording the loading request generation with respect to the programs and/or data that is to be operated in said system to calculate the related priority of said programs and/or data for being loaded into the respective hierarchy storages on the basis of said loading request generation; and

selecting higher priority programs and/or data to be loaded on a higher speed hierarchy storage on the basis of the recorded information as follows: when the priority of a program and/or data residing on the higher speed hierarchy storage is lower than the priority of a program and/or data residing on the lower speed hierarchy storage, a program and/or data on the higher speed hierarchy storage is selected during each predetermined execution time to effect the transfer of the latter program and/or data into the higher speed hierarchy storage and to transfer the former program and/or data into the lower speed hierarchy storage.

4,703,423

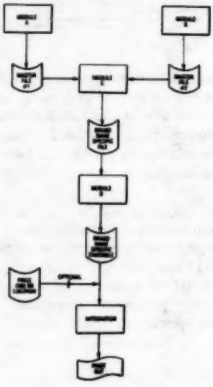
APPARATUS AND METHOD FOR GENERATION OF BRAND NAME SPECIFIC ADVERTISING MEDIA

Charles W. Bado, Ft. Lauderdale, and Randy Detrick, Hollywood, both of Fla., assignors to Recipe Terminal Corporation, Fort Lauderdale, Fla.

Filed Jul. 10, 1984, Ser. No. 629,415

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—400 **22 Claims**



1. An apparatus comprising a series of interconnected modules for composing brand name specific advertising media based upon a combination of sponsor and consumer input, said apparatus comprising:

(a) a first module for creation, in non-volatile memory, of one or more brand name specific meal-recipe data files based upon sponsor designation of one or more ingredients of a meal-recipe as its brand name product, said sponsor designation representing different unrelated suppliers, said meal-recipe file being organized and retrievable by one or more fields and in combinations of one or more fields;

(b) a second module for retrieval of said data from said brand name specific meal-recipe file, in the form of brand name specific meal-recipe plans, from the module specified in subparagraph (a) above, bsed upon consumer input of prescribed consumer oriented criteria; and

(c) a third module for displaying the brand name specific meal-recipe plan which has been retrieved from the brand name specific meal-recipe files, said display means including an electronic display and/or permanent copy of such plan, the format of said meal-recipe plan identifying each

ingredient of said plan, having sponsor designation, by brand name, or as a generic ingredient, in the absence of sponsor designation, said sponsor designation representing different unrelated suppliers,

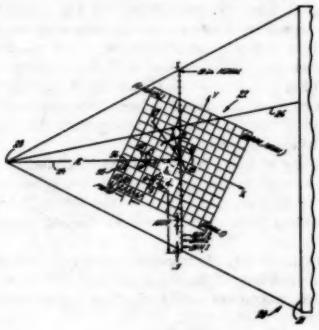
each of said modules being interactive with one another and either integrated within a data processing equipment or existing as stand-alone components, said stand-alone components being part of an interactive data processing network.

4,703,424

METHOD AND MEANS OF CORRECTING FOR A SHIFT IN THE CENTER OF ROTATION OF A ROTATING FAN BEAM CT SYSTEM

Grant T. Gullberg, Waukesha, and Carl R. Crawford, Milwaukee, both of Wis., assignors to General Electric Company, Waukesha, Wis.

Filed Jan. 3, 1985, Ser. No. 688,486
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—414 17 Claims



1. In a fan beam computed tomographic system having a detector system for taking a plurality of projections at a plurality of angles, each projection defining a plurality of projection bins, the computed tomographic system having a given center of rotation which is shifted from the midline of the fan by a predetermined shift distance, a method of compensating for the shift in performing the computed tomographic reconstruction comprising the steps of, producing a non-constant series of weighting functions, one for each projection bin in the fan beam projection sets and which are dependent on the detector geometry and the magnitude of the shift; weighting the information in each projection bin in the fan beam projection sets with its associated weighting function to produce corrected fan beam projection sets, convolving the corrected fan beam projection sets with a filter function to produce convolved corrected fan beam projection sets, setting up a coordinate system in pixelized space located with respect to said pixelized space to take account of the shift, and back projecting the convolved corrected fan beam projection sets into the pixelized space using said coordinate system to produce a CT image corrected for the shift.

4,703,425

LANGUAGE PROCESSING DICTIONARY FOR BIDIRECTIONALLY RETRIEVING MORPHEMIC AND SEMANTIC EXPRESSIONS

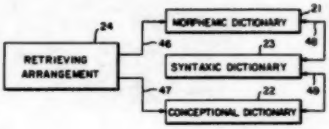
Kazunori Muraki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 17, 1985, Ser. No. 755,812
Claims priority, application Japan, Jul. 17, 1984, 59-148138
Int. Cl.[4] G06F *15/38, 15/21*
U.S. Cl. 364—419 2 Claims

1. A language processing dictionary responsive to an input expression for producing an output expression, said language processing dictionary comprising;

a morphemic, a conceptional, and a syntaxic dictionary for keeping morphemic, conceptional, and syntaxic items, respectively, each morphemic item comprising a morphemic description and a first pointer pointing to a set of predetermined at least one of said syntaxic items; each conceptional item comprising a conceptional description and a second pointer pointing to a set of prescribed at least one of said syntaxic items; each syntaxic item comprising a syntaxic description and a third and a fourth pointer pointing to a set of preselected at least one of said morphemic items and to a set of preselected at least one of said conceptional items, respectively; and

retrieving means responsive to said input expression for



retrieving one of said morphemic items as a particular item and one of said conceptional items as a specific item when said input expression is morphemic and conceptional, respectively, responsive to the first pointer of said particular item for retrieving one of said morphemic and said conceptional items as a selected item that is retrieved with reference to the first through the fourth pointers, and responsive to the second pointer of said specific item for retrieving one of said morphemic items as a special item that is retrieved with reference to the first through the fourth pointers, said retrieving means thereby producing one of the morphemic and the conceptional descriptions as said output expression that is comprised by said selected item and producing one of the morphemic descriptions as said output expression that is comprised by said special item.

4,703,426

METHOD AND APPARATUS FOR REVIEWING AND MODIFYING HORIZONS OF A THREE-DIMENSIONAL SEISMIC VOLUME

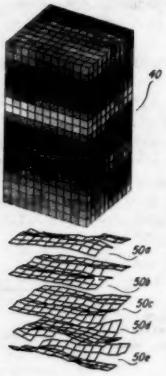
Bruce E. Flinchbaugh, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 8, 1984, Ser. No. 669,503
Int. Cl.[4] G01V *1/00*
U.S. Cl. 364—421 26 Claims

1. A computer system for reviewing and modifying horizons of a three-dimensional seismic volume, the horizons being defined by a network of points, wherein paths interconnecting the points may each have a curvature in the vertical direction (time) over a distance in the X or Y horizontal directions; comprising:

(a) means for assessing the curvature of each of the paths of points of the network in both the X and Y directions;

(b) means for determining whether the curvature exceeds a threshold value for each of the paths of points; and



(c) means for terminating any of the paths at the point where the curvature exceeds the threshold value.

4,703,427

METHOD FOR EVALUATING THE QUALITY OF CEMENT SURROUNDING THE CASING OF A BOREHOLE

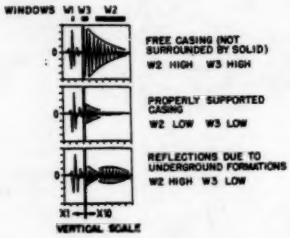
Gerard Catala, Meudon; Ian Stowe, Montrouge, and Daniel Henry, Gyf-sur-Yvette, all of France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Aug. 21, 1985, Ser. No. 767,933

Claims priority, application France, Aug. 24, 1984, 84 13220

Int. Cl.[4] G01N *29/04*; C01V *1/40*

U.S. Cl. 364—422 **32 Claims**



1. A method for evaluating the quality of cement surrounding a borehole casing, comprising:

(a) obtaining signals which are a function of the axial and angular position of a sonde relative to said casing and which are received in response to ultrasonic pulses suitable for inducing thickness resonance in a casing, said pulses having been emitted by a plurality of emitter/receiver transducers aimed in different angular directions at zones of said casing;

(b) defining at least two time windows for each of said obtained signals, at least one of said time windows being defined by a first echo corresponding to the reflection of an ultrasonic wave off the inside wall of said casing, and at least another of said time windows corresponding to the initial portion of additional echoes following said first echo, said additional echoes resulting from the environment outside said casing;

(c) determining at least one normalized magnitude from at least the energy of said signals in said time windows;

(d) setting at least one act of upper and lower thresholds corresponding to said at least one normalized magnitude; and

(e) deciding the quality of the environment surrounding said casing as a function of the relationship of said determined normalized magnitude with said set of upper and lower

23. A method for evaluating the quality of cement surrounding a borehole casing, comprising:

(a) obtaining signals by placing a sonde in said casing, the sonde carrying a tool provided with ultrasonic emitter/-receiver transducers aiming at zones in different angular directions, and said tranducers being suitable for inducing thickness resonance in the casing;

(b) selectively exciting said transducers to emit pulses;

(c) selectively recording the signals received in response to each emitted pulse, said signals containing data on the environment surrounding the casing in the zone scanned by the transducer, taking account of the axial and angular position of the sonde in the casing;

(d) defining at least two time windows for each of said obtained signals, at least one of said time windows being defined by a first echo corresponding to the reflection of an ultrasonic wave off the inside well of said casing, and at least another of said time windows corresponding to the initial portion of additional echoes following said first echo, said additional echoes resulting from the environment outside said casing;

(e) determining at least one normalized magnitude from at least the energy of said signals in said time windows;

(f) setting at least one set of upper and lower thresholds corresponding to said at least one normalized magnitude; and

(g) deciding the quality of the environment surrounding said casing as a function of the relationship of said determined normalized magnitude with said set of upper and lower thresholds.

4,703,428

POWER TRAIN CONTROL METHOD ON COMMON INPUT DATA

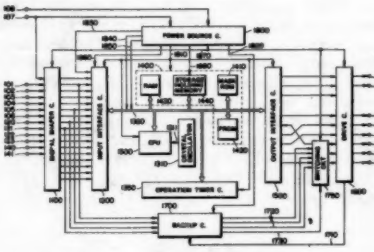
Akio Hosaka, and Sadao Takase, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 6, 1984, Ser. No. 678,885

Claims priority, application Japan, Dec. 14, 1983, 58-234146

Int. Cl.[4] B60K *41/08*; F16H *5/66*; G05D *17/02*

U.S. Cl. 364—424.1 **5 Claims**



2. A method of controlling a power train of an automotive vehicle, the power train including an engine and a transmission operatively connected with the engine, the method comprising the steps of:

detecting an engine revolution speed of the engine and generating an engine revolution speed indicative signal;

detecting an engine output torque of the engine and generating an engine output torque indicative signal;

detecting an output shaft revolution speed and generating an output shaft revolution speed indicative signal;

generating an engine control output data based on said engine revolution speed indicative signal and said engine output torque indicative signal;

generating a transmission control output data based on said engine output torque indicative signal and said engine output revolution speed indicative signal;

controlling the engine based on said engine control output data; and

controlling the transmission based on said transmission control output data.

4,703,429

SYSTEM AND METHOD FOR CONTROLLING A VEHICLE SPEED OF AN AUTOMOTIVE VEHICLE

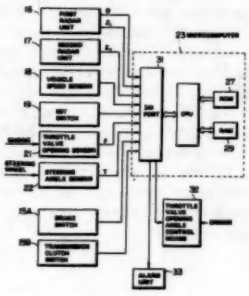
Masao Sakata, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Jul. 19, 1985, Ser. No. 756,882

Claims priority, application Japan, Jul. 20, 1984, 59-149590

Int. Cl.⁴ G06F *15/50*

U.S. Cl. 364—426 **11 Claims**



1. A system for controlling a vehicle speed, comprising:

(a) first means for monitoring the presence of an object moving relative to the vehicle, measuring a distance from the vehicle to the moving object, and outputting Doppler signals having different directivities based on a movement of the moving object relative to the vehicle;

(b) second means for calculating a change rate of a phase difference between the Doppler signals derived from said first means with respect to the distance measured by said first means;

(c) third means for determining a radius of curvature of a traffic lane on which the vehicle moves;

(d) fourth means for determining whether the moving object monitored by said first means is moving on the same traffic lane as the vehicle on the basis of the magnitude of the change rate of the phase difference derived from said second means with respect to a reference value the reference value being associated with the distance measured by said first means and being set according to the radius of curvature of the traffic lane determined by said third means; and

(e) fifth means for detecting and controlling the vehicle speed so as to follow the moving object on the same traffic lane at a predetermined safe intervehicle distance to the moving object on the basis of the detected vehicle speed and distance detected by said first means when said fourth means determines that the moving object is moving on the same traffic lane.

4,703,430

METHOD CONTROLLING AIR-FUEL RATIO

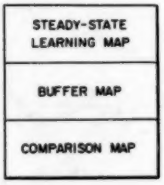
Matsuo Amano, Hitachi; Masami Shida, Mito; Masahide Sakamoto, Katsuta; Takeshi Hirayama, Mito, and Takao Sasayama, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

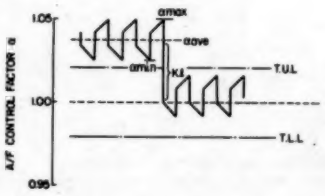
Filed Nov. 19, 1984, Ser. No. 672,591

Claims priority, application Japan, Nov. 21, 1983, 58-217838; Mar. 10, 1984, 59-44835

Int. Cl.⁴ F02D *5/00*

U.S. Cl. 364—431.05 **7 Claims**





1. In a method of controlling fuel injection in an internal combustion engine wherein the fuel injection timing for operation of a fuel injector is based at least on a basic fuel injection time and a compensation factor which is determined in a learning process during engine operation for each of a plurality of operating regions formed by a range of values of at least two predetermined engine conditions, a method of determining the values of said compensation factor for said plurality of operating regions, comprising the steps of:

(a) calculating said compensation factor at predetermined intervals during the operation of said engine;

(b) storing a calculated compensation factor in a first memory at a storage location therein which represents an operating region defined by the values of said predetermined engine conditions existing at the time the compensation factor is calculated;

(c) reproducing the contents of said first memory in a second memory when a compensation factor has been stored in a predetermined number of the storage locations of said first memory;

(d) estimating and storing compensation factors in storage locations of said first memory other than said predetermined number of storage locations on the basis of the compensation facotrs previously stored so that all storage locations hold a compensation factor;

(e) transferring the contents of said first memory to a third memory after a compensation factor has been stored in all storage locations of said first memory;

(f) reproducing the contents of said second memory in said first memory and continuing the storing of calculated compensation factors in said first memory; and

(g) determining the ignition fuel timing for said engine on the basis of said basic fuel injection time and the compensation factors stored in said third memory.

4,703,431

SLIVER DRAWING APPARATUS

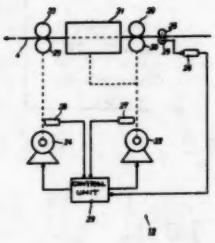
Shizuka Sako, Kasugai; Kanetoshi Amaike, Kani, and Youji Watanabe, Kasugai, all of Japan, assignors to Chuba Seiko Co., Ltd., Kasugai, Japan

Continuation of Ser. No. 646,122, Aug. 31, 1984, abandoned. This application Oct. 8, 1986, Ser. No. 915,875

Claims priority, application Japan, Sep. 5, 1983, 58-163013; Sep. 5, 1983, 58-163014

Int. Cl.[4] G06F *15/46*; D01H *5/32*

U.S. Cl. 364—470 **9 Claims**



1. A sliver drawing apparatus, comprising:

feed rollers and front rollers substantially provided along a moving direction of a sliver for drawing said sliver while exerting compressive stresses thereto;

a first motor for driving said front rollers;

a second motor for driving said feed rollers;

first sensor means for detecting the rotational speeds of said first and second motors;

second sensor means for detecting an actual thickness of a portion of said sliver at a position upstream of said feed rollers in said moving direction and emitting a signal proportional thereto;

first electromagnetic brake means and second electromagnetic brake means for starting and stopping said first motor and said second motor, respectively; and

control means including:

(a) memory means for storing said signal from said second sensor means,

(b) means for emitting a signal from said memory means, based upon said signal from said second sensor means, after a lapse of time sufficient for said sliver portion to pass said feed rollers, said lapse of time being determined in response to factors including a speed ratio of said first and second motors and a distance between said second sensor means and said feed rollers,

(c) means responsive to said signal from said emitting means for controlling the speed ratio of said first and second motors such that a sliver having a uniform thicknes emerges from said front rollers, and

(d) brake control means for emitting signals to said first and second brake means for:

(i) simultaneously releasing said first and second brake means when a control voltage of said brake control means crosses a predetermined level during a start of rotation of said motors, and

(ii) simultaneously activating said first and second brake means when the control voltage of said brake control means crosses a predetermined level at the end of rotation of said motors.

4,703,432

ELECTRONIC CONTROL DEVICE FOR INDUSTRIAL SEWING MACHINES

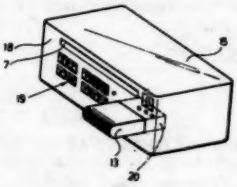
Ernst Müller, Tübach, Switzerland, assignor to Helmut Schips, Switzerland

Filed Dec. 12, 1984, Ser. No. 680,827

Claims priority, application European Pat. Off., Dec. 15, 1983, 83112598.4

Int. Cl.[4] G06F *15/46*; D05B *19/00*

U.S. Cl. 364—470 **10 Claims**



1. An electronic control device for industrial sewing machines, comprising a housing, a microprocessor located within the housing, a programmable fixed value memory in circuit with the microprocessor, a non-volatile read/write memory capable of connection to the housing through a socket, said read/write memory storing all program steps for sewing an article, said read/write memory comprising a number of program steps, each group consisting of a number of memories, said number of memories equalling a corresponding number of different article sizes, each memory in each group being associated with one of said article sizes, each of said article sizes corresponding to a different stitch number, means detachably connecting said read/write memory to the housing of the control device, and a display and entry keyboard located on a front plate of said housing, wherein the keyboard is used to enter a sign of the article size so that the microprocessor reads out of the corresponding memory a number corresponding to a selected article size.

4,703,433

VECTOR NETWORK ANALYZER WITH INTEGRAL PROCESSOR

David D. Sharrit, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 9, 1984, Ser. No. 569,622

Int. Cl.[4] G01R *23/00, 27/02*

U.S. Cl. 364—485 **13 Claims**

1. An RF frequency network analyzer for analyzing the response of a device under test comprising:

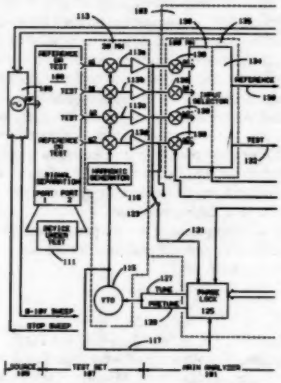
converter means for digitizing an RF signal representative of the response of the device under test to an applied RF signal;

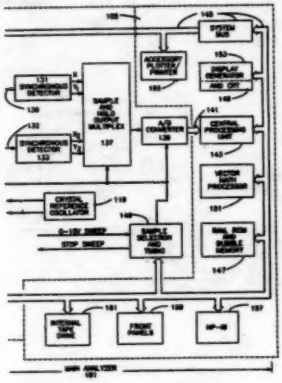
processor means coupled to the converter means for digitally processing the digitized RF signal in the frequency domain to calculate a transfer function for the device under test based on the response to the applied RF signal;

said processor means also for calculating a frequency domain signal corresponding to the response of the device under test to a simulated RF signal based on the calculated transfer function; and

transform means coupled to the processor means for converting the calculated frequency domain signal into a time

domain signal in substantially real time using a Chirp Z transform, the time domain signal representing the response as a function of time of the device under test to the simulated RF signal.



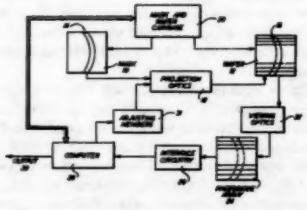


4,703,434

APPARATUS FOR MEASURING OVERLAY ERROR

Timothy A. Brunner, Norwalk, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Apr. 24, 1984, Ser. No. 602,878
Int. Cl.[4] G01B 9/02; G06F 15/60
U.S. Cl. 364—488 **12 Claims**



1. Apparatus for measuring overlay error between a wafer pattern and a mask pattern projected onto the wafer by a lithographic exposure instrument comprising:

a grating mask;

a reflective grating wafer patterned substantially the same as said mask;

said lithographic instrument having projection optics mounted to project an arcuate image of said mask on said wafer, and means for moving said grating mask and grating wafer relative to said projection optics;

the grating on said wafer being offset from the grating on said mask forming Moire fringes corresponding to the overlay error between the wafer pattern and the mask pattern projected onto the wafer;

a photodiode array, deposed to detect said arcuate image , each photodiode of said photodiode array corresponding to a pixel on said grating wafer, and providing an output representative of the intensity of said arcuate image;

viewing optics mounted to project said Moire fringes on to said photodiode array; and

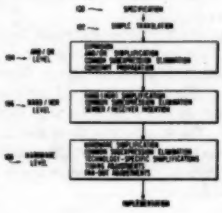
computing means for outputting overlay error signals responsive to the output from said photodiode array.

4,703,435

LOGIC SYNTHESIZER

John A. Darringer, Mahopac, and William H. Joyner, Jr., Katonah, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 16, 1984, Ser. No. 631,364
Int. Cl.[4] G06F 7/00, 15/60
U.S. Cl. 364—489 **24 Claims**



15. An automated logic synthesis method of designing, on a computer, a logic circuitry implementation in a desired technology from input data to said computer comprising a description of operating characteristics to be provided by said logic circuitry, said method comprising the steps of:

generating, via said computer, a first logic circuit design in a first logic system in accordance with said description;

simplifying said first logic design via said computer;

converting, via said computer, said first logic design to a second logic design in a second logic system requiring fewer different logic operators than in said first logic design, said second logic design comprising a plurality of interconnected cells and performing equivalent functions as said first logic design;

simplifying said second logic design via said computer;

converting, via said computer, said simplified second logic design to a hardware design in said desired technology comprising a plurality of interconnected hardware components; and

simplifying said hardware design via said computer, said step of simplifying said hardware design comprising: applying a first hardware transformation set for substituting technology specific components for predetermined patterns of said hardware;

dotting signal lines via said computer, to decrease the number of components in said hardware logic design and to decrease fan-in in some portions of said hardware logic

design even if the number of components is said portions is not decreased;

adjusting path lengths in said hardware logic design via said computer; and

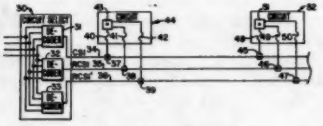
correcting fan-out in said hardware logic design to a desired value via said computer.

4,703,436

WAFER LEVEL INTEGRATION TECHNIQUE

Ramesh C. Varshney, San Jose, Calif., assignor to Inova Microelectronics Corporation, Santa Clara, Calif.

Filed Feb. 1, 1984, Ser. No. 576,066
Int. Cl.[4] G06F *15/60*; G11C *7/00*
U.S. Cl. 364—490 **32 Claims**



1. A method of fabricating a group of interconnected functional circuits on a semiconductor wafer comprising:

fabricating on the semiconductor wafer a plurality of circuits each circuit having at least one associated interconnecting grid pad, each of the plurality of cirouits being electrically isolated from every other one of the plurality of circuits;

testing all of the plurality of circuits to determine whether each is a functional circuit or a non-functional circuit;

isolating each non-functional circuit from at least one of its associated interconnecting grid pads; and

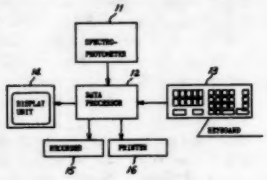
after performing the step of testing, forming a conductive pattern on the semiconductor wafer to connect all of the interconnecting grid pads which pattern is independent of the distribution of functional and non-functional circuits on the wafer.

4,703,437

APPARATUS FOR SPECTROANALYSIS

Takashi Nishimura, Kyoto, Japan, assignor to Shimadzu Corporation, Kyoto, Japan

Filed Nov. 5, 1984, Ser. No. 668,322
Claims priority, application Japan, Nov. 7, 1983, 58-209600
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—498 **6 Claims**



1. Apparatus for spectroanalysis comprising

a spectrophotometer,

a first memory for storing programs for different types of unit data processing operations,

a second memory having a plurality of channels for storing data,

a keyboard containing a first group of keys for designating said programs, a second group of keys for entering parameters for data processing, and a key for selecting a multiple data processing mode,

a control circuit operable, upon designation of one of said programs by a corresponding one of said first group of keys, to process the output data produced by said spectrophotometer measuring a sample in accordance with said designated program and, upon selection of a multiple data processing mode and subsequent designation of selected ones of said programs by depressing the corresponding keys of said first group in a selected order, to form a multiple data processing program for performing said designated unit data processing operations sequentially in said selected order and cause the output data of said spectrophotometer to be processed in accordance with said multiple data processing program, and

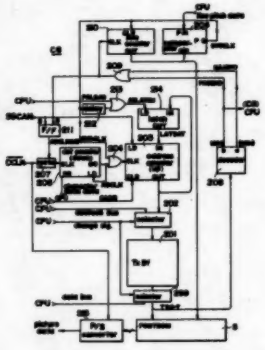
a data bus for interconnecting the output of said spectrophotometer, said first and second memories, said keyboard and said control circuit.

4,703,438

CHARACTER SIGNAL GENERATOR

Masaaki Nishiyama, Toyokawa, and Atsuyuki Tanaka, Toyohashi, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 28, 1985, Ser. No. 706,738
Claims priority, application Japan, Mar. 1, 1984, 59-40214
Int. Cl.[4] G06F *15/40*; G09G *1/06*
U.S. Cl. 364—519 **7 Claims**



1. A character signal generator comprising:

a text buffer having a plurality of storage regions for storing character codes or carriage return codes in designated addresses and for outputting the character codes or the carriage return codes stored in the designated addresses;

a first signal generating means for generating a first signal relating to an output timing of picture data;

a code detecting means for detecting the carriage return codes output from said text buffer and for generating a detection signal in accordance with the detection of the carriage return codes;

a return signal count circuit for counting the detection signal and for generating a second signal when the count value of the return signal count circuit reaches a specified count value;

an address counter for counting the first signal and the second signal and for outputting an address designating signal in accordance with the counted value of the first signal and the second signal, said address designating signal designating the address of said text buffer;

a load signal generating means for generating a load signal at a specified time after the second signal is generated; and

a latch means for latching the address designating signal when the load signal is generated and for inputting the

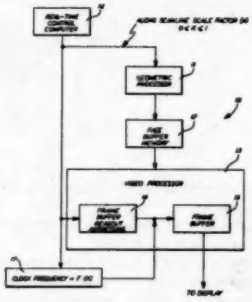
latched signal into said address counter, said address counter treating the latched signal as a count start data.

4,703,439

VIDEO PROCESSOR FOR REAL TIME OPERATION WITHOUT OVERLOAD IN A COMPUTER-GENERATED IMAGE SYSTEM

Robert W. Lotz, Scotts Valley, Calif., assignor to The Singer Company, Binghamton, N.Y.

Filed Dec. 5, 1984, Ser. No. 678,205
Int. Cl.[4] G06F *15/62*; G09G *1/16*
U.S. Cl. 364—521 8 Claims



1. In a computer-generated image system adapted to process image data in real-time and having predetermined image data processing capacity, comprised of:

geometric processor means programmable to generate data signals in terms of pixels per scanline representing predetermined object faces for use in scenes formed by a raster scan display device,

video processor means connected to receive signals from said geometric processor means to process predetermined scene content features using said data signals representing predetermined object faces,

means to prevent overload of said video processor means including means to vary resolution of the visual scenes in real time;

real-time control means connected to control a clock under which the image data generated by both said geometric processor means and said video processor means is read out in real time for said display device,

said real-time control means being a control computer adapted to control the operation of said geometric processor means to vary a scale factor (K) in the direction of a scan line, where K is equal to or greater than zero and is equal to or less than one,

said video processor means including frame buffer memory to store and to retrieve said data signals representing predetermined object faces, and

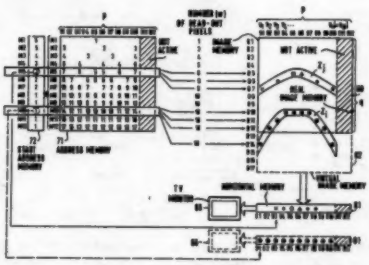
frame buffer read out addressing means connected to said frame buffer memory means to vary the addressing of said data signals and connected to said clock to achieve a ready retrieval of said data signals.

4,703,440

METHOD AND APPARATUS FOR PROCESSING ULTRASONIC ECHO SIGNALS

Adalbert Birk, and Ulrich Saugeon, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 589,655, Mar. 14, 1984, abandoned.
This application Feb. 5, 1987, Ser. No. 14,211
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1983, 3308994
Int. Cl.[4] G06F *15/72*; H04N *7/01*
U.S. Cl. 364—521 16 Claims



1. A method for representing ultrasonic echo signals obtained in succession from an ultrasonic scan having a defined geometric form, said method comprising the steps of:

forming a plurality of image vectors of equal length, each image vector consisting of vector data and representing a selected plurality of ultrasonic signals received along an ultrasonic scanning line after emission of an ultrasonic pulse;

entering said image vectors of equal lengths in an image memory having a matrix of memory cells, said image vectors being entered in columnar fashion independently of said geometric form for intermediate storage of said vector data in said image memory;

reading said vector data from said image memory along curved read-out lines in a format controlled by predetermined representation information stored in an address memory associated with said image memory corresponding to the geometric form of the ultrasonic scan for reconstructing the correct geometric form of said scan, and representing said image vectors at their respective original positions within said scan, thereby using said information stored in said address memory to address said image memory for read-out thereof; and

displaying the vector data read from said image memory on a display means in a manner conforming to television standards.

4,703,441

COLOR DISPLAY METHOD FOR NC SYSTEM HAVING AUTOMATIC PROGRAMMING FUNCTION

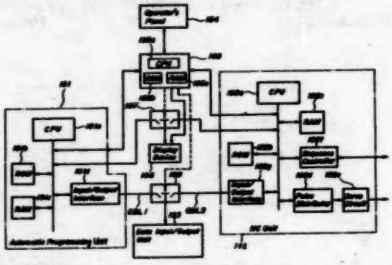
Hajimu Kishi; Teruyuki Matsumura, and Kunio Tanaka, all of Tokyo, Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP84/00285, § 371 Date Feb. 6, 1985, § 102(e) Date Feb. 6, 1985, PCT Pub. No. WO84/04979, PCT Pub. Date Dec. 20, 1984
PCT Filed Jun. 5, 1984, Ser. No. 705,424
Claims priority, application Japan, Jun. 6, 1983, 58-100445
Int. Cl.[4] G06F *15/72*
U.S. Cl. 364—526 7 Claims

1. A color display method for an NC system having an automatic programming function and equipped with an automatic programming unit for administering automatic programming, an NC unit for administering numerical control, an operator's panel and a color display device provided for common use by both the automatic programming unit and NC unit,

and a control unit which causes the operator's panel and the color display device to operate on behalf of the one of the NC unit and automatic programming unit which corresponds to a selected mode, based on selection information, entered from a selection key provided on the operator's panel, for selecting an automatic programming mode or an NC mode, comprising the steps of:

(a) storing beforehand a correlation between a display item and a display color in the NC mode;



(b) informing the NC unit, via the control unit, of the name of an item for which display has been requested when a predetermined item display request key provided on the operator's panel is pressed while in the NC mode; and

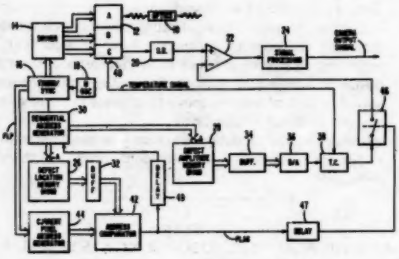
(c) applying color information, which corresponds to the item for which display has been requested, to the color display device, so that the color display device displays the requested item in color.

4,703,442

TEMPERATURE TRACKING DEFECT CORRECTOR FOR A SOLID-STATE IMAGER

Peter A. Levine, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 25, 1985, Ser. No. 779,861
Int. Cl.[4] H04N 5/14
U.S. Cl. 364—521 **7 Claims**



1. Imaging apparatus, comprising:

solid-state imaging means including an array of photosensitive elements for providing an image-representative signal including nonimage-representative signal components corresponding to ones of said photosensitive elements, said nonimage-representative components having temperature dependent amplitude levels;

means for providing a temperature signal representative of the present temperature of said solid-state imaging means;

means responsive to said temperature signal for sequentially providing a plurality of temperature dependent correction signals corresponding to said ones of said photosensitive elements, said temperature dependent correction signals having amplitudes which track the amplitude of respective ones of said temperature dependent nonimage-representative signal components; and

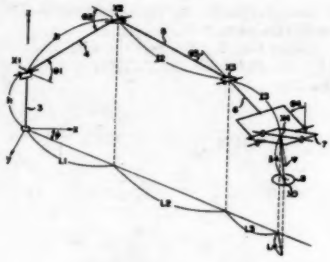
means for combining respective ones of said correction signals with said image-representative signal so as to provide cancellation of said temperature dependent nonimage-representative components of said image-representative signal.

4,703,443

DEVICE FOR MEASURING THE SHAPE OF A THREE-DIMENSIONAL OBJECT

Takashi Moriyasu, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 7, 1985, Ser. No. 699,133
Claims priority, application Japan, Feb. 16, 1984, 59-27424
Int. Cl.[4] G01B 3/14, 5/24
U.S. Cl. 364—559 **8 Claims**



1. A device for measuring the shape of a three-dimensional object comprising:

a movable arm having a plurality of movable arm members coupled in tandem by joints;

a probe coupled to the forward end of said movable arm by a universal joint, said probe adapted for contacting the three-dimensional object, the shape of which is to be measured, and said probe being rotatable and having at its forward end a flat surface portion which is provided perpendicular to an axis of said probe and which contacts said three-dimensional object;

angle-of-rotation encoder means for detecting the angles of rotation of said probe and said movable arm members during the measurement of the shape of the three-dimensional object; and

calculating means for calculating, on the basis of information from said angle-of-rotation encoder means and the dimensions of said movable arm, the orientation of said flat surface portion of said probe in contact with the three-dimensional object, to thereby determine a tangent plane at the contact point between said flat surface portion and said three-dimensional object, and determining the shape of the three-dimensional object from a plurality of tangent planes at contact points between said flat surface portion of said probe and said object.

4,703,444

SYSTEMS FOR DETERMINING DISTANCES TO AND LOCATIONS OF FEATURES ON A GOLF COURSE

Harrison A. Storms, Jr., Rancho Palos Verdes, and William C. Cockerell, Jr., Ramona, both of Calif., assignors to Spymark, Incorporated, Vista, Calif.

Continuation of Ser. No. 519,404, Aug. 1, 1983, abandoned. This application Apr. 3, 1986, Ser. No. 847,734
Int. Cl.[4] G01C 15/20; G01S 3/02
U.S. Cl. 364—561 **8 Claims**

1. A system for determining distances on a golf course, comprising:

a set of at least three remote station transmitters located at

known locations about the golf course to define a triangle encompassing substantial portion of the golf course, wherein each of the transmitters transmits a repetitive ranging signal and wherein the combined ranging signals from the set of transmitters define repetitive sets of ranging signals;

a portable interrogation unit, which includes:

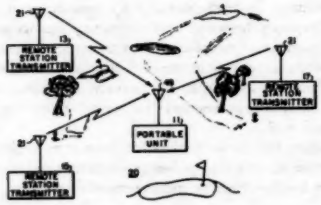
means for entering a request pertaining to the distance between the location of the portable interrogation unit and a specified location selected from various predetermined locations on the golf course, said predetermined locations including the locations of various predetermined golf course features;

means for receiving the sets of ranging signals from the transmitters;

interrogation unit processing means for processing the received sets of ranging signals to determine the distance between the portable interrogation unit and said specified location on the golf course indicated by the entered request, said processing means including:

means for processing the received sets of ranging signals to provide an indication of the location of the portable interrogation unit on the golf course;

an interrogation unit memory for storing data indicating the location of each of the various predetermined locations on the golf course;



means for accessing the memory in response to the specified location included in the entered request to retrieve an indication of the specified location on the golf course; and

means for processing the indication of the location of the portable unit and the indication of the specified location to determine the requested distance; and

means responsive to said distance determination for displaying an indication of the requested distances; and

a portable survey unit for determining the location of specified predetermined features on the golf course, wherein the survey unit includes:

means for entering data identifying a specified predetermined feature selected from various predetermined features on the golf course;

means for receiving the sets of ranging signals from the transmitters;

survey unit processing means for processing the received sets of ranging signals to determine the location on the golf course of the feature indicated by the entered feature identification data; and

a memory for storing said determined feature location in storage areas addressed by the entered feature identification data.

4,703,445

ATHLETIC SHOE FOR RUNNING DISCIPLINES AND A PROCESS FOR PROVIDING INFORMATION AND/OR FOR EXCHANGING INFORMATION CONCERNING MOVING SEQUENCES IN RUNNING DISCIPLINES

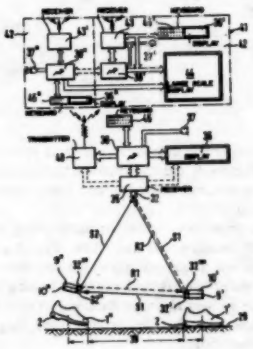
Armin A. Dassler, Herzogenaurach, Fed. Rep. of Germany, assignor to PUMA AG Rudolf Dassler Sport (formerly PUMA-Sportschuhfabriken Rudolf Dassler KG), Herzogenaurach, Fed. Rep. of Germany

Filed Feb. 13, 1985, Ser. No. 701,194

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1984, 3405081

Int. Cl.[4] G01C *22/00*; G08B *23/00*

U.S. Cl. 364—561 **28 Claims**



1. An athletic shoe system for running disciplines having a sensor means provided in a sole of at least one shoe of a pair of shoes for emitting signals as a function of contact between the sole and the ground, a transmitter means in at least one of said pair of shoes for receiving said signals from the sensor means and for transmitting emissions in correspondence with the receipt of said signals, at least one receiver means for receiving the emissions from the transmitter means, and computer means linked with the receiver means for determining the length of strides taken with the pair of shoes as a function of the signals emitted by the sensor means based on the emissions received by the receiver means, wherein said sensor means comprises a ground contact responsive sensor in a first shoe of said pair of shoes, wherein said transmitter means comprises a transmitter in each of said shoes, wherein said receiver means comprises a receiver in a second shoe of said pair of shoes and a remote receiver coupled to said computer means, and wherein said computer means, via the remote receiver coupled to the computer means, receives emissions from said transmitters based upon the issuance of said signals by said sensor means and has means for determining the distance between said shoes as a function of a delay in receiving emissions directly from said transmitter in the first shoe relative to the receipt thereof via the receiver and transmitter in the second shoe.

4,703,446

DATA PROCESSING UNIT DIAGNOSIS CONTROL APPARATUS

Yuya Momose, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 28, 1985, Ser. No. 750,075

Claims priority, application Japan, Jul. 3, 1984, 59-137699; Aug. 10, 1984, 59-168641

Int. Cl.[4] G06F *9/06, 11/30, 15/16*

U.S. Cl. 364—580 **11 Claims**

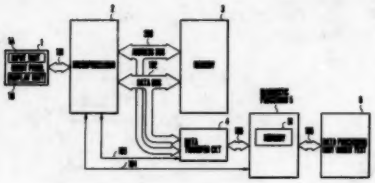
1. A data processing unit diagnosis control apparatus comprising:

a microprocessor for controlling processing of a service

request, a transfer of data to and from a data processing apparatus to be diagnosed, and selection of a diagnostic program for a diagnostic maintenance operation;

memory means for storing said diagnostic program and said data, said memory means accessible by said microprocessor;

data transfer means for reading out said diagnostic program selected by said microprocessor and said data stored in said memory means and sending out the same in accordance with an instruction from said microprocessor, and



for recciving the data from said data processing apparatus to be diagnosed and transferring the same to said memory means in accordance with said instruction from said microprocesor; and

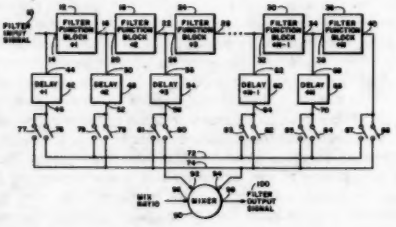
diagnostic processor means for performing diagnosis of said data processing apparatus to be diagnosed according to said selected diagnostic program and data sent from said data transfer means and communicating a status of the diagnosis to said microprocessor through said data transfer means, thereby performing said diagnostic maintenance operation.

4,703,447

MIXER CONTROLLED VARIABLE PASSBAND FINITE IMPULSE RESPONSE FILTER

David E. Lake, Jr., Penn Valley, Calif., assignor to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Apr. 5, 1985, Ser. No. 720,663
Int. Cl.[4] G06F 7/38; G06G 7/02
U.S. Cl. 364—724 **21 Claims**



1. An apparatus for transforming an input signal into an output signal having selected characteristics comprising:

means for variably filtering the input signal, the filtering means having a plurality of filter output signals including a final filter output signal;

means for individually delaying the input signal and the filter output signals except the final filter output signal, the delaying means producing a plurality of delayed filter output signals which are coincident with the final filter output signal;

means for selectively combining the delayed filter output signals and the final filter output signal, the combining means producing a pair of combined output signals; and

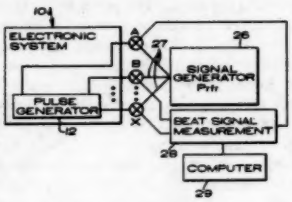
means for proportionally mixing the combined output signals to produce the output signal.

4,703,448

METHOD FOR MEASURING SKEW OR PHASE DIFFERENCE IN ELECTRONIC SYSTEMS

Gerald F. Muething, Jr., Pleasanton, Calif., assignor to Nicolet Instrument Corporation, Madison, Wis.

Filed Oct. 25, 1984, Ser. No. 664,857
Int. Cl.[4] G01R 25/08; H03D 13/00
U.S. Cl. 364—481 **7 Claims**



1. In a digital electronic system in which sampling pulses having a frequency f_o and a period P_o are generated by a sampling source and propagated to a plurality of signal sampling points, a method for measuring the skew or phase difference between the sampling pulses as they arrive at the sample points, the method including the steps of:

producing a reference signal having a period P_r and a frequency f_r;

beating the sampling pulses at each sampling point with said reference signal to produce a plurality of beat signals at each sampling point;

determining, at least partially by measurement, the edge discrepancy between beat frequency signals in terms of the number of sampling pulses that occur therein;

computing a quantity termed effective measurement interval which is equivalent to the difference of the period P_o of the sampling pulses and the period P_r of the reference signal; and

computing the skew or phase difference by multiplying the number of sampling pulses representing the edge discrepancy by the effective measurement interval.

4,703,449

INTERRUPT DRIVEN MULTI-BUFFER DMA CIRCUIT FOR ENABLING CONTINUOUS SEQUENTIAL DATA TRANSFERS

Ari P. Berman, Ashland, Mass., assignor to Data Translation Inc., Marlboro, Mass.

Continuation of Ser. No. 470,402, Feb. 28, 1983, Pat. No. 4,599,689. This application May 28, 1986, Ser. No. 868,257
Int. Cl.[4] G06F 12/00, 13/00
U.S. Cl. 364—900 **13 Claims**

1. Computer apparatus for continuously transferring data words from a peripheral unit to a plurality of buffer memories, each of said said buffer memories having a plurality of storage locations with sequential addresses for storing a predetermined number of data words, said apparatus comprising,

a plurality of overrun memory areas, each of said overrun memory areas having a predetermined number of storage locations and being assigned to one of said plurality of buffer memories,

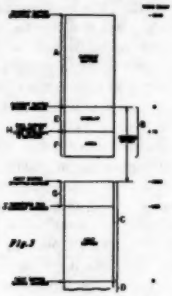
a direct memory access circuit responsive to data words generated by said peripheral unit for storing said data words in sequential storage locations in a first one of said buffer memories, said direct memory access circuit comprising,

means responsive to the storage of each data word in said first one of said buffer memories generating a count number indicating the total number of data words stored in said first buffer memory, and

means responsive to said count number for generating an interrupt signal when said first buffer memory becomes

filled with data words, said direct memory access circuit continuing to store data words in storage locations with sequential addresses in said overrun memory area associated with said first buffer memory, and

means responsive to said interrupt signal for controlling said



direct memory access circuit to store data words received from said peripheral unit in a second one of said buffer memories starting at a location spaced from the beginning of said second buffer memory a number of locations equal to the number of data words stored in said overrun memory area assigned to said first buffer memory.

4,703,450

INTERFACE DEVICE

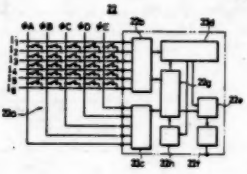
Susumu Sueyoshi; Satoru Tokui, and Kelichiro Nanba, all of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 524,632, Aug. 19, 1983, abandoned. This application Dec. 22, 1986, Ser. No. 942,919

Claims priority, application Japan, Aug. 20, 1982, 57-144167; Aug. 20, 1982, 57-144168; Aug. 20, 1982, 57-144170; Aug. 20, 1982, 57-144171; Aug. 20, 1982, 57-144172

Int. Cl.[4] G06F *3/00*

U.S. Cl. 364—900 **5 Claims**



1. In an electronic system including a computer having at least an input port and an output port, said computer outputting print data, which is in format for printing, in parallel format through said output port, and a remotely-controllable device which is operable in accordance with a plurality of remocon codes; an interface device comprising:

a plurality of bus line terminals for transmitting said print data having more significant digits and less significant digits, a first set of said bus line terminals transmitting said more significant digits and a second set of said bus line terminals transmitting said less significant digits;

code converter means for converting said print data to output data, said code converter means comprising in turn:

a read-only memory connected to said bus line terminals;

first BCD-decimal decoder having 8 bit parallel data bus lines, for receiving said more significant digits from said data bus lines; and

a second BCD-decimal decoder having 8 bit parallel data bus lines, for receiving said more significant digits from said data bus lines;

a remocon transmitting integrated circuit for receiving said output data from said code converter means and outputting a remocon code signal in accordance with said output data;

amplifier means connected to said remocon transmitting integrated circuit for amplifying said remocon code signal;

a timing circuit, including a first timer having a first time constant, and a second timer having a second time constant that is twice as long as said first time constant; and

a video detection circuit for detecting a video signal in accordance with an output of said timing circuit.

4,703,451

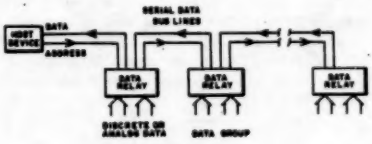
DATA RELAY SYSTEM

Frank A. Calabrese, 118 S. Broad, Waynesboro, Pa. 17268

Continuation of Ser. No. 488,000, May 2, 1983. This application Aug. 6, 1986, Ser. No. 894,083

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—900 **2 Claims**



1. A data communicating system comprising

host means for transmitting a plurality of different addresses,

a plurality of serially connected data relay means each being interfaced to a data source for acquiring data from the data source and transmitting the data to said host means, each of said data relay means including

means for storing one of said addresses to identify said data relay means,

address input means for receiving each of said addresses originally transmitted by said host means,

address output means for reinforcing each of said received addresses and transmitting each reinforced address downstream to the address input means of the next downstream data relay means,

unidirectional data output means for reinforcing and transmitting data to the next upstream data relay means,

data input means for receiving data transmitted by the unidirectional data output means of the next downstream data relay means and routing said data to said unidirectional data output means of this data relay means, and

address selector means responsive to said stored address for transmitting the data from the data source to said unidirectional data output means.

4,703,452

INTERRUPT SYNCHRONIZING CIRCUIT

Robert J. Abrant, Villa Park, Ill.; Michael D. Martys, Pittsfield, Mass., and George K. Tarleton, Itasca, Ill., assignors to GTE Communication Systems Corporation, Northlake, Ill.

Filed Jan. 3, 1986, Ser. No. 815,842

Int. Cl.[4] G06F *13/42*

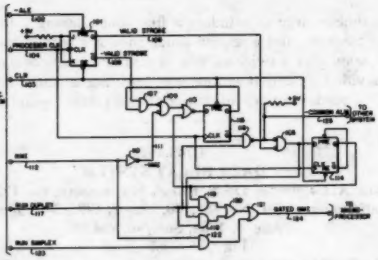
U.S. Cl. 364—900 **12 Claims**

1. A synchronizing circuit for use in a computer including duplicated processors, and duplicated systems, each system associated with a different one of said processors and a different one of said synchronizing circuits, each of said systems being operated to provide a synchronized processor instruction status signal, synchronized clock pulses and an interrupt signal, each said synchronizing circuit comprising:

signaling means connected to said associated system and operated in response to alternately occurring synchronized clock pulses and the synchronized processor in-

struction status signal from said associated system to provide synchronizing pulses;

a first storage circuit connected to said signaling means and said associated system and operated in response to said interrupt signal from said associated system and one of said synchronizing pulses to provide an alarm signal; and



a second storage circuit connected to said first storage circuit and connected to the first storage circuit of the other synchronizing circuit and operated in response to said alarm signal from said first storage circuit or said alarm signal from said first storage circuit of the other synchronizing circuit to apply a synchronized interrupt signal to said associated processor.

4,703,453

SEMICONDUCTOR MEMORY WITH AN IMPROVED DUMMY CELL ARRANGEMENT AND WITH A BUILT-IN ERROR CORRECTING CODE CIRCUIT

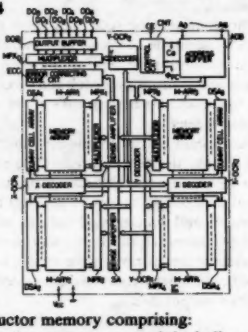
Takashi Shinoda, and Osamu Sakai, both of Kodaira, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 15, 1983, Ser. No. 466,483

Claims priority, application Japan, Feb. 15, 1982, 57-21130

Int. Cl.[4] G11C *17/00, 29/00*

U.S. Cl. 365—104 **16 Claims**



1. A semiconductor memory comprising:

a first and second memory array each including: a plurality of read only memory cells each having a selection terminal, an output terminal and a reference terminal and arranged in a matrix form; a plurality of word lines arranged in parallel in a direction of columns of said matrix; a plurality of data lines arranged in parallel in a direction of rows of said matrix; and a plurality of grounding lines arranged in parallel in the direction of said rows;

said selection terminal of each read only memory cell being connected to one of said word lines, said output terminal of each read only memory cell being connected to one of said data lines, and said reference terminal of each read only memory cell being connected to one of said grounding lines;

first and second common data lines;

a differential sense amplifier having a pair of input terminals, one of which is coupled to said first common data line and the other of which is coupled to said second common data line;

a first column switch which is arranged between said first common data line and said first memory array and which is controlled by first switch control signals respectively to couple one of the plural data lines of said first memory array to said first common data line;

a second column switch which is arranged between said second common data line and said second memory array and which is controlled by second switch control signals to selectively couple one of the plural data lines of said second memory array to said second common data line;

a plurality of dummy cells provided to respectively correspond to the data lines of said first and second memory arrays and each including: an output terminal to be coupled to the corresponding one of said data lines; a selection terminal to be fed with an operation control signal; and a reference terminal to be fed with a ground potential of the circuit; said dummy cells operating to apply a reference potential for said differential sense amplifier to the corresponding ones of said data lines when they are respectively brought into their operative states; and

a selecting circuit including a first plurality of output terminals, which are to be coupled to the word lines of said first and second memory arrays and a second plurality of output terminals which are to be coupled to the selection terminals of said dummy cells,

wherein the reference potential, which is provided for said differential sense amplifier when one of the memory cells of said first memory array is selected, is generated by that one of said dummy cells which is coupled to said second memory array, while the reference potential, which is provided for said differential sense amplifier when one of the memory cells of said second memory array, is generated by that one of said dummy cells which is coupled to said first memory array.

4,703,454

CMOS STATIC STORAGE CELL HAVING NONCROSSING INTERCONNECTION CONDUCTORS

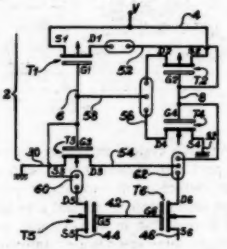
Pierre Jeuch, Seyssins, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jul. 1, 1985, Ser. No. 750,517

Claims priority, application France, Jul. 5, 1984, 84 10674

Int. Cl.[4] G11C *11/00, 5/02*

U.S. Cl. 365—154 **5 Claims**



A CMOS static storage cell comprising a bistable element formed from a first and a second P MOS transistor and from a third and fourth N MOS transistor, a fifth and a sixth channel N MOS transistor used for controlling the bistable element, the sources and drains of said six transistors being diffused in a seimconductor substrate and the gates of said six transistors being formed in a first conductive layer achieved on said substrate, wherein the transistors of the bistable element are electrically interconnected, so that:

the gates of said first and third transistors are interconnected by a first connection line formed in said first conductive layer;

the gates of said second and fourth transistors are interconnected by a second connection line formed in said first conductive layer;

the sources of said first and second transistors are connected to one another and to an electric power supply by a third connection line diffused in said substrate;

the sources of the third and fourth transistors are connected to earth, by respectively a fourth and a fifth connection line formed in a second conductive layer;

the drain of the first transistor is connected to the gate of the second transistor by a sixth connection line formed in a third conductive layer and which is in direct contact with said transistor drain and with an extension of said second transistor gate;

the drain of the second transistor is connected to the gates of the first and third transistors as well as to the drain of the fourth transistor, by means of a seventh connection line formed in said third conductive layer and which is in direct contact with the drains of said second and fourth transistors and with an extension of said first connection line; and

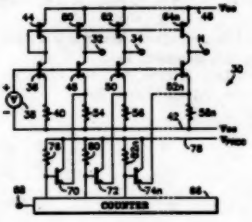
the drain of the third transistor is connected, in the bistable element, to the gate of the fourth transistor by an eighth connection line formed in said third conductive layer and which is in direct contact with said third transistor drain and with an extension of said fourth transistor gate.

4,703,455

BIPOLAR PROGRAMMABLE MEMORY AND METHOD

Byron G. Bynum, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 23, 1985, Ser. No. 812,659
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—174 11 Claims



8. A bipolar memory cell having a plurality of outputs at which appear respective logic output signals, comprising:

a reference transistor having a collector coupled to a power supply conductor and having a predetermined low current gain characteristic associated therewith;

a plurality of output transistors each having respective collector-emitter conduction paths coupled between said power supply conductor and a respective one of the outputs of the memory cell, each of said output transistors having substantially the same low current gain characteristics as said reference transistor;

current source means for providing substantially equal currents to the bases of said reference transistor and said plurality of output transistors;

circuit means for sinking predetermined currents from said reference transistor and said plurality of output transistors wherein logic output signals of a first logic level are produced at the outputs of the memory circuit; and

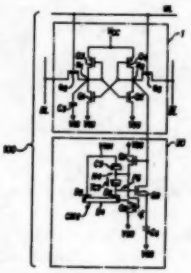
means for non-destructively degrading the low current gain characteristic of selected ones of said plurality of output transistors to cause the logic output signal at the associated output to be changed from said first level to a second level.

4,703,456

NON-VOLATILE RANDOM ACCESS MEMORY CELL

Hideki Arakawa, Yokohama, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Apr. 23, 1986, Ser. No. 858,465
Claims priority, application Japan, Apr. 24, 1985, 60-87718
Int. Cl.[4] G11C *11/70*
U.S. Cl. 365—185 6 Claims



1. A non-volatile random access memory cell comprising:

a volatile memory cell for storing a datum comprising

flip-flop circuit having a first and second nodes on which complementary signals corresponding to the stored datum are output, and

a first capacitor connected to said first node; and

a non-volatile memory cell comprising

a second capacitor, operatively connected to said second node, having a capacitance larger than that of said first capacitor,

a memory transistor having a floating gate, connected between said second node and said second capacitor, said memory transistor acting as a switch in accordance with the polarity of the charge stored at said floating gate,

a capacitor circuit comprising a tunnel capacitor operatively connected to said floating gate,

means, operatively connected to said capacitor circuit, for applying a writing voltage having an amplitude large enough to cause a tunnel current to flow through said tunnel capacitor,

a first transistor, operatively connected to said second node and to said capacitor circuit, for controlling the polarity of said tunnel current in accordance with said stored datum, said first transistor generating an output in response to one of said complementary signals at said second node, and

a second transistor, operatively connected to said capacitor circuit receiving the output of said first transistor, for controlling the polarity of said tunnel current in accordance with said stored datum,

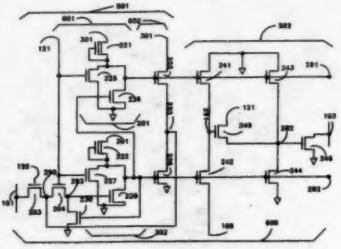
said first and second transistors cooperatively controlling the polarity of the tunnel current to flow through said tunnel capacitor when said writing voltage is applied to said capacitor circuit, one of said first and second transistors being ON and the other being OFF when said tunnel current is to be flown, said polarity of the tunnel current being controlled to be in one of two directions opposite to each other depending on which one of said first and second transistors is ON, said two directions being such that said floating gate is provided with one of negative and positive charges by said tunnel current in one of said two directions, respectively.

4,703,457

REGISTER CIRCUIT USED TO LOAD, HOLD, AND DUMP DIGITAL LOGIC SIGNALS

Paul R. Bodenstab, Ft. Collins, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 21, 1986, Ser. No. 854,375
Int. Cl.[4] G11C 7/00
U.S. Cl. 365—189 5 Claims



1. A circuit for storing the logic state of a data signal, responsive to a load signal and a clock signal and generating first and second output signals, each signal having a first and second voltage level, the circuit comprising:

first switching means responsive to the load signal for connecting the data signal to a first storage node having a first and second voltage level;

second switching means responsive to the clock signal for connecting the first storage node to a second storage node having a first and second voltage level;

a first NOR gate having an output connected to the first output signal and having first and second inputs connected to the second storage node and the clock signal;

a second NOR gate having an output connected to the second output signal and having first and second inputs connected to the clock signal and the first output signal;

third switching means responsive to the second output signal for setting the first storage node to the first voltage level; and

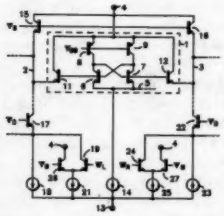
fourth switching means responsive to the first output signal for setting the first storage node to the second voltage level.

4,703,458

CIRCUIT FOR WRITING BIPOLAR MEMORY CELLS

James J. Stipanuk, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 16, 1985, Ser. No. 809,540
Int. Cl.[4] G11C 7/00
U.S. Cl. 365—189 3 Claims



1. A memory circuit including a first voltage terminal and a second terminal, said memory circuit comprising:

a plurality of bit lines;

a plurality of word lines;

a plurality of first means, each of said first means coupled to one of said word lines for selectively applying voltage to said one of said word lines;

a plurality of second means, each of said second means coupled between said one of said word lines and said second voltage terminal for sinking current from said one of said word lines;

a plurality of third means, each of said third means coupled to a pair of said bit lines for enabling current through said bit lines;

a plurality of fourth means, each of said fourth means coupled between said second voltage terminal and each of said third means for sinking a read current through said pair of said bit lines;

a plurality of fifth means, each of said fifth means coupled between one of said third means and said second voltage terminal for selectively sinking a write current; and

a plurality of memory cells, wherein said memory cells are arranged in a matrix of rows and columns, each of said memory cells in a row coupled between said first voltage terminal and one of said word lines, each of said memory cells in a column coupled between a pair of said bit lines, said memory cells comprising:

a first load;

a second load;

a pair of latchable cross-coupled transistors having their collectors coupled to one of said word lines, their emitters coupled to said first supply voltage terminal by said first and second loads, respectively, and their bases coupled to each other's emitter;

sixth means coupled between said first voltage terminal and said first bit line and coupled to said base of one of said pair of latchable cross-coupled transistors for sinking current from said base of said one of said pair of latchable cross-coupled transistors; and

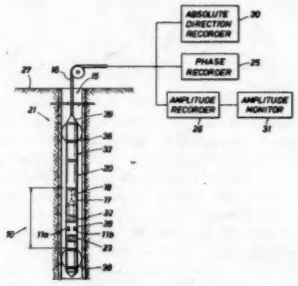
seventh means coupled between said first voltage terminal and said second bit line and coupled to said base of the other of said pair of latchable cross-coupled transistors for sinking current from said base of the other of said pair of latchable cross-coupled transistors.

4,703,459

DIRECTIONAL ACOUSTIC LOGGER APPARATUS AND METHOD

Frank M. Bower, Edmond, Okla., assignor to Exxon Production Research Company, Houston, Tex.

Filed Dec. 3, 1984, Ser. No. 677,776
Int. Cl.[4] G01V 1/40
U.S. Cl. 367—25 16 Claims



1. A rotatable directional acoustic logging apparatus for detecting noise from a source external to the apparatus, comprising:

a first and a second cylindrical piezoelectric crystal transducer positionable in a borehole spaced apart from each other in a plane substantially perpendicular to the longitudinal axis of said borehole and with the cylindrical axes of the transducers substantially parallel to the longitudinal axis of said borehole, said transducers opposable to each other and capable of generating an output while rotating simultaneously; and

means for electrically prpocessing said output to determine the amplitude and phase difference of the output from the

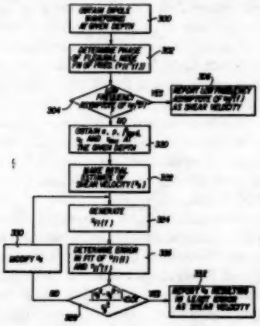
first and the second transducer, said means capable of determining the direction of said noise by correlating the position of minimum phase difference between the first transducer and the second transducer with the output which identifies the transducer leading in phase at a position 90 degrees from the osition of said minimum phase difference.

4,703,460

METHOD AND APPARATUS FOR ACOUSTIC DIPOLE DIRECT SHEAR WAVE WELL LOGGING

Andrew L. Kurkjian, Bethel; Shu-Kong Chang, West Redding, and Ann H. Everhart, Danbury, all of Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Dec. 28, 1984, Ser. No. 687,074
Int. Cl.[4] G01V *1/40*
U.S. Cl. 367—31 **14 Claims**



1. A method of directly determined the shear velocity of a formation traversed by a fluid-filled borehole, comprising the steps of:

obtaining a set of waveforms from a broadband dipole acoustic investigation of the formation relative to a common location in the borehole;

selecting a filter cutoff frequency f_{cut};

low-pass filtering said waveforms in accordance with frequency f_{cut};

determining an interim shear velocity v_s from said filtered waveforms;

performing said selecting, filtering, and determinimg steps for for an initial f_{cut}, and subsequently for additional decreasing values of f_{cut}, until a preselected relationship between the value of f_{cut} and v_s is satisfied; and preselected relationship being indicative of the effective absence in said waveforms of energy having a velocity less than the shear speed; and

reporting the last-determined value of v_s as the shear velocity.

4,703,461

UNIVERSAL MUD PULSE TELEMETRY SYSTEM

Oleg Kotlyar, Salt Lake City, Utah, assignor to Eastman Christensen Co., Salt Lake City, Utah

Filed Mar. 31, 1986, Ser. No. 845,938
Int. Cl.[4] H04H *9/00*
U.S. Cl. 367—83 **14 Claims**

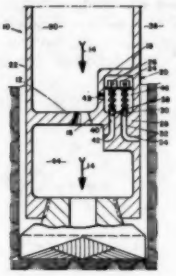
1. A method of multistate generation of mud pulsed telemetered signals comprising the steps of:

primarily flowing hydraulic mud through a fixed restriction in a drill string; and

selectively and secondarily bypassing a fraction of hydraulic mud from said primary flow to a plurality of points downstream from said fixed restriction,

wherein a portion of said fraction of said primary flow is selectively bypassed to at least one of said plurality of points downstream to rejoin said primary flow inside said drill string, and

wherein the remaining portion of said fraction of said primary flow is selectively bypassed to at least one of said plurality of points downstream to be removed from said



primary flow to said at least one point outside of said drill string,

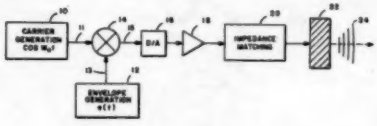
whereby a plurality of pressure states is defined within said drill string according to combinations of said step of selectively bypassing said restriction.

4,703,462

VIRTUALLY STEERABLE PARAMETRIC ACOUSTIC ARRAY

Harvey C. Woodsum, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Apr. 15, 1985, Ser. No. 723,018
Int. Cl.[4] G01S *9/66, 9/68*
U.S. Cl. 367—92 **12 Claims**



1. A sonar system of the type wherein a carrier signal is modulated by an envelope signal and the modulated carrier signal is returned from an echo source as a reflected signal, the improvement comprising:

means for converting the reflected signal to a digital reflected signal;

a first digital integrator for digitally integrating the digital reflected signal and producing a digital integrated signal;

a digital filter having a response matched to the envelope signal for digitally filtering the digital integrated signal thereby producing a digital filtered signal;

means for autoregressive modelling the digital filtered signal as the impulse response of a filter having a complex s-plane pole thereby providing a digital complex pole location; and

means for converting the digital complex pole location to a digital bearing signal proportional to the bearing of the echo source.

4,703,463

SEISMIC VIBRATION APPARATUS

Bernell Izard, 8240 E. Lightningview, Parker, Colo. 80134

Filed Apr. 9, 1986, Ser. No. 849,908
Int. Cl.[4] G01V *1/047*
U.S. Cl. 367—147 **2 Claims**

1. An apparatus for introducing vibrations into the ground comprising

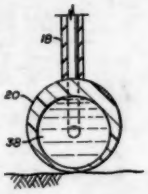
a brittle container,

a pair of electrodes positioned within said container in spaced relationship to each other,

means providing electric power,

electrical transmission lines connecting said electric power

means with said said electrodes,
means for creating an electric potential between said electrodes sufficient to generate a spark discharge,
means for placing said container on the ground,
salt water within said container whereby the discharge of the electrical potential across said electrodes develops an explosive force to introduce vibrations into the ground,
said container is a tube and said electrodes are positioned in



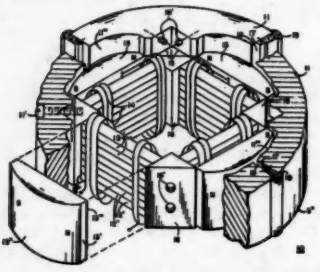
the ends of the tube with the salt water between the electrodes substantially filling the tube,
said tube has an eccentricity between its inner surface and its exterior surface so that one portion thereof is thinner than the remainder of the tube whereby the acoustic pulse generated can be directionally controlled by coupling the thinner side with the ground.

4,703,464

PERMANENT MAGNET BIASED MAGNETOSTRICTIVE TRANSDUCER

Thomas R. Howarth, Portsmouth; Peter F. Flanagan, Cranston; William J. Harrold, Kingston, and Kenneth Rodberg, East Providence, all of R.I., assignors to Raytheon Company, Lexington, Mass.

Filed May 10, 1985, Ser. No. 732,332
Int. Cl.[4] H04R *15/00*
U.S. Cl. 367—156 21 Claims



1. A transducer comprising:
a paramagnetic magnetostrictive material;
a coil for providing an alternating current magnetomotive force to said material;
permanent magnet means providing a magnetic flux density within and along the length of said material;
said magnetic flux density within said material provided by the shape of said permanent magnet means being substantially uniform over the length of said material;
said coil being between said magnetostrictive material and said magnet means;
said magnet means being smaller in transverse area at the ends of said magnet means than at its center and said magnet means being uniformly transversely spaced from said coil along the length of said magnet means; and
a mass connected to said magnetostrictive material to produce acoustic energy when said coil is energized with an alternating current to produce said alternating current magnetomotive force.

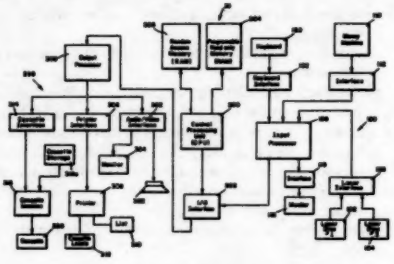
4,703,465

METHOD AND APPARATUS FOR PRODUCING AN AUDIO MAGNETIC TAPE RECORDING FROM A PRESELECTED MUSIC LIBRARY

Lorne A. Parker, Middleton, Wis., assignor to 1K Entertainment Center Ltd., Quebec, Canada

Filed Dec. 4, 1985, Ser. No. 804,803
Int. Cl.[4] G11B *7/28*
U.S. Cl. 369—30 8 Claims

1. An apparatus for producing an audio cassette tape composed of a multiplicity of randomly selected prerecordings comprising:
a. an Input Processor Means;
b. said Input Processor Means further comprising an Analog to Digital Converter Means;
c. a First Laser Disc Means;
d. a Second Laser Disc Means;
e. said First Laser Disk Means reading information in the forward direction and said Second Laser Disc Means reading information in a reverse direction;
f. said First Laser Disc Means and said Second Laser Disc Means connected to said Input Processor Means through a Laser Disc Interface Means;
g. Money Machine Means connected through a Money Interface Means to said Input Processor Means;
h. a Keyboard connected through Keyboard Interface Means to said Input Processor Means;
i a Central Processing Unit;
j. said Input Processor Means connected through an Input-/Output Interface Means to said Central Processing Unit;
k. said Central Processing Unit comprising Random Access Memory and Programmable Read Only Memory;
l. said Central Processing Unit connected through said Input/Output Interface Means to an Output Processor Means;
m. said Output Processor Means further comprising a Digital to Analog Converter Means;
n. said Output Processor Means connected through an Audio-Video Interface Means to a Monitor;
o. said Output Processor Means connected through a Printer Interface Means to a Printer;



p. said Output Processor Means connected through a Selection Interface Means to a Selection Duplicating Means said Selection Duplication Means including a cassette recorder which records at approximately 15 times normal speed;
q. an audio selection library contained within said First Laser Disc Means and said Second Laser Disc Means;
r. said Central Processing Unit further comprising an internal micro processor programmed for, controlling on input to the Random Access Memory in the form of laser disc information from First Laser Disc Means and Second Laser Disc Means, controlling keyboard information from said Keyboard, controlling money regulation from said Money Machine Means, controlling printer output from said Printer, and controlling audio signal duplication by said Selection Duplicating Means; and
s. said audio selection library initially stored on said First

Laser Disc Means and said Second Laser Disc Means wherein a desired selection is converted from an analog to a digital signal by said Analog to Digital Converter Means of the Input Processor Means and thereafter stored in said Random Access Memory of said Central Processing Unit from which the Central Processing Unit removes the digital signal selected and transfers it through said Input-/Output Interface Means to said Output Processor Means and then to said Digital to Analog Converter of the Output Processor Means which transforms the digitized audio signal to the analog format, and then the analog format signal is transferred through said selection Interface Means to said Selection Duplicating Means from which the signal of the desired selection is transferred to a cassette and recorded at approximately fifteen times normal speed;

t. whereby said Input Processor Means, said Central Processing Unit, and said Output Processor Means are interconnected by appropriate computer software to create an audio selection duplicating system wherein a selection of desired audio recordings which are stored on said First Laser Disc Means and said Second Laser Disc Means is chosen and input through said Keyboard and the appropriate amount of money is deposited into said Money Machine Means and the selections are transmitted from said First Laser Disc Means and said Second Laser Disc Means through said Input Processor Means to said Central Processing Unit and then to said Output Processor Means, and then to said Monitor where the selections are displayed, to said Printer where appropriate labels are produced and to said Selection Duplicating Means where the selected audio recordings are recorded onto a cassette at approximately fifteen times normal speed and the recorded cassette is thereafter dispensed from the system.

4,703,466

DEVICE AND METHOD FOR CONTROLLING MOVEMENT OF FOCUSING LENS FOR OPTICAL DISK READING APPARATUS

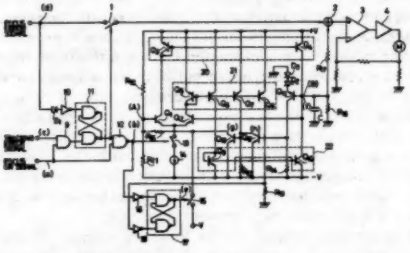
Yoshikiyo Konno, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 1, 1984, Ser. No. 667,798

Claims priority, application Japan, Nov. 1, 1983, 58-169558

Int. Cl.⁴ G11B 7/00

U.S. Cl. 369—45 **1 Claim**



1. A device for controlling the movement of a focusing lens of an apparatus for reading an optical disk, comprising:

servo loop switch means which is held open when a focus servo control mode is not established and is held closed when the focus servo control mode is established;

adder means for adding (1) a focus error signal for the focus servo control fed through the servo loop switch means and (2) a focus lens drive voltage signal for driving the focusing lens to move from a position remote from the optical disk to a focus servo-controllable position while a focus servo loop is open, and for providing a sum output;

driver amplifier means receiving at its input the output of the adder means;

motor means, which is moved in response to an output of the drive amplifier means, for moving the focusing lens;

activatable logic circuit means which receives (1) a focus-ON signal for instructing movement of the focusing lens into the focus servo-controllable position, (2) the focus error signal and (3) a tracking signal;

integrating means for producing, as an output, the focus lens drive voltage signal, of either rising form or descending form, whereby the focusing lens is moved towards and away from the disk according to the form of the drive voltage signal; and

controlling means for controlling the integrating means so that the output of the integrating means has either a voltage-rising form or a voltage-descending form;

the logic circuit means being activated in response to the focus-ON signal, and the activated logic circuit means being arranged to provide a first output to the controlling means to cause the drive signal produced by the integrating means to retract the focusing lens away from, and then advance the focusing lens towards, the disk, and also being arranged to provide a second output to the controlling means to cause the drive signal produced by the integrating means not to advance the focusing lens further towards the disk, the activated logic circuit means (1) switching from providing the first output to providing the second output in response to the focus error signal's crossing a predetermined threshold value and (2) switching from providing the second output to providing the first output in response to the tracking signal's changing to indicate a loss of tracking information.

4,703,467

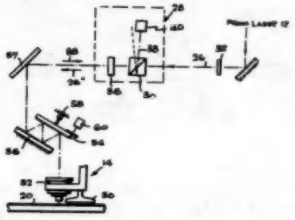
VIDEO DISC READ BACK SCANNER

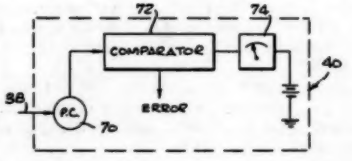
James E. Elliott, San Pedro, Calif., assignor to Discovision Associates, Costa Mesa, Calif.

Division of Ser. No. 290,261, Aug. 3, 1981, Pat. No. 4,451,913, which is a continuation of Ser. No. 924,538, Jul. 14, 1978, Pat. No. 4,282,598, which is a continuation-in-part of Ser. No. 812,180, Jul. 1, 1977, abandoned, which is a continuation of Ser. No. 662,238, Feb. 27, 1976, abandoned, which is a continuation-in-part of Ser. No. 465,823, May 1, 1974, Pat. No. 3,944,727, which is a division of Ser. No. 299,893, Oct. 24, 1972, Pat. No. 3,829,622. This application Apr. 29, 1983, Ser. No. 489,923

Int. Cl.⁴ G11B 7/095

U.S. Cl. 369—44 **7 Claims**





1. An improved tracking system for use in an optical disc playback system for recovering information from a selected one of a plurality of information tracks provided on a reflective optical disc, the average reflectivity of any one of the information tracks being different from the reflectivity of the disc between the tracks, said playback system including: an optical system for directing a beam of radiant energy onto a reflective

disc and for directing the radiant energy reflected by the disc to a detector; and beam steering means for moving the beam of radiant energy radially relative to the disc being read to follow a selected one of the information tracks,

said improved tracking system controlling the beam steering means such that the beam impinges a predetermined edge portion of the track being read, said tracking system comprising:

a photocell detector arranged to receive all of the radiant energy of a beam reflected by the disc being read and to output a recovered signal proportional thereto;

comparator means for comparing the level of said recovered signal with a reference level and for generating an error signal having a first characteristic when the recovered signal indicates that the beam is impinging more than said predetermined edge portion of the track being followed, and having a second characteristic when the recovered signal indicates that the beam is impinging less than said predetermined edge portion; and,

wherein further, said characteristic of the error signal is the polarity; and the amplitude of the error signal is proportional to the difference between the recovered signal level and the reference level.

4,703,468

OPTICAL DISC TRACKING SERVO CIRCUIT HAVING COMPENSATION FOR DISC DEFECTS AND EXTERNAL DISTURBANCES

Hideyuki Baba, and Shigeyoshi Mitsumori, both of Kosai, Japan, assignors to Sony Corporation, Tokyo, Japan

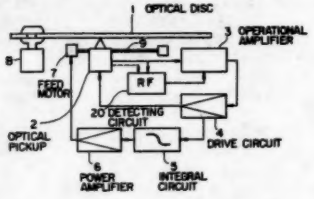
PCT No. PCT/JP84/00465, § 371 Date May 21, 1985, § 102(e) Date May 21, 1985, PCT Pub. No. WO85/01605, PCT Pub. Date Apr. 11, 1985

PCT Filed Sep. 29, 1984, Ser. No. 740,841

Claims priority, application Japan, Sep. 30, 1983, 58-180606

Int. Cl.⁴ G11B *7/095, 21/10*

U.S. Cl. 369—44 **2 Claims**



1. A tracking servo circuit for controlling the tracking of an optical pickup on an optical disc, wherein the control is effected with a tracking error signal and a loop gain control signal obtained from an RF signal generated from said optical pickup, said tracking servo circuit comprising:

first means adapted for producing a first detection signal upon detecting an upper envelop of the RF signal modulated when the optical pickup encounters a defect on the optical disc;

second means adapted for producing a second detection signal upon detecting a lower envelop of the RF signal modulated when an external disturbance is applied to the optical pickup;

first adjusting means for setting the loop gain of the tracking servo circuit at a first predetermined gain different from a normal circuit gain, upon receipt of said first detection signal; and

second adjusting means for setting the loop gain of the tracking servo circuit at a second predetermined gain different from the normal circuit gain and higher than said first gain, upon receipt of said second detection signal.

4,703,469

OPTICAL DATA RECORDING USING RADIATION OF DIFFERENT CHARACTERISTICS

Robert M. Pettigrew; Keith Gardner, both of Foxton, and Robert J. Longman, Cambridge, all of United Kingdom, assignors to Plasmon Data Systems, P.V., Curacao, Netherlands Antilles

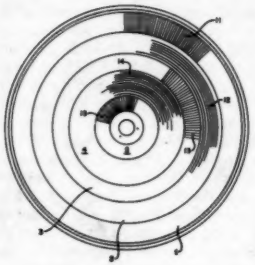
PCT No. PCT/GB84/00123, § 371 Date Feb. 11, 1985, § 102(e) Date Feb. 11, 1985, PCT Pub. No. WO84/03986, PCT Pub. Date Oct. 11, 1984

PCT Filed Apr. 9, 1984, Ser. No. 681,992

Claims priority, application United Kingdom, Apr. 7, 1983, 8309447

Int. Cl.⁴ G11B *7/00, 3/70*

U.S. Cl. 369—101 **5 Claims**



1. An optical data storage member, prior to recording information thereon, comprising an optically-recordable surface having a plurality of tracks in which information may be recorded in analogue or digital form, the tracks being of a first type in which the material constituting the track is heat sensitive, and is sensitive to radiation of a first predetermined characteristic but not to radiation of a second predetermined characteristic, and a second type in which the material thereof is also heat sensitive but is sensitive to radiation of said second predetermined characteristic, but not to radiation of said first predetermined characteristc, said material constituting each of said tracks constituting means for changing state in response to heating to alter reading characteristics when irradiated by one of said predetermined types of radiation but not when irradiated by the other of said predetermined type of radiation; wherein tracks of the first type alternate across the surface of the optical data storage member with tracks of the second type, whereby the information may be recorded by irradiating the first and second tracks with radiation respectively of the first and second characteristics so that spaces between adjacent tracks are not required to prevent cross-talk;

said member being of circular form and wherein the tracks are disposed concentrically about the centre of the circular form which constitutes a disk;

said tracks of said first type being constituted by a surface carrying a plurality of closely spaced grooves arranged in a first direction, and wherein the tracks of said second type are constituted by a surface carrying a plurality of closely spaced grooves arranged in a second direction, said first and second directions being mutually substantially orthogonal;

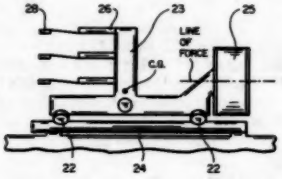
said tracks of said first type carrying radial grooves, and said tracks of said second type carrying concentric grooves; and

said adjacent tracks being optically distinguishable from one another by virtue of their response to polarized radiation constituting said predetermined types of radiation.

4,703,470
DYNAMIC ABSORBER DEVICE FOR USE WITH DISK DRIVES

Joseph T. Castagna, San Jose, and Sean McEligot, Palo Alto, both of Calif., assignors to Priam (Delaware) Corporation, San Jose, Calif.

Filed Aug. 15, 1985, Ser. No. 765,677
Int. Cl.[4] G11B 3/10
U.S. Cl. 369—215 **2 Claims**



1. A disk drive having structural components subject to vibrations, resonances and noise comprising:
- a bidirectional carriage for supporting accessing magnetic heads;
- a plurality of rails for guiding said carriage along a linear path;
- a base casting for supporting said carriage and rails, sand carriage, rails and base casting being subject to vibrations, resonance and noise effects;
- at least one dynamic absorber located on said carriage, rails or base casting, said absorber being tuned to a natural frequency of resonance substantially at the frequency of the component subject to deformation or vibration or noise effects, said absorber including a viscoelastic link element having a central aperture;
- an absorber mass on which said link element is seated, said mass having an aperture coaxially aligned with said central aperture of said link element;
- an absorber base having a post section protruding through said apertures and a crown section disposed on said link element, said link element surrounding at least a portion of said post section, said post section protruding through said aperture for attachment to the carriage assembly,
- the design of the dynamic absorber being such that the center of mass of the absorber mass coincides with the center of the viscoelastic link in three planes, thereby eliminating the occurrence of higher frequency modes of vibration of the absorber caused by the rocking of the absorber mass on the viscoelastic link.

4,703,471
MONOLITHICALLY INTEGRATED ELECTRO-OPTICAL MULTIPLEXER/DEMULTIPLEXER

Michael M. Fitelson, Dewitt; Stephen Wanuga, and Jack B. Williams, both of Liverpool, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Jan. 2, 1985, Ser. No. 688,375
Int. Cl.[4] H04B 9/00
U.S. Cl. 370—1 **1 Claim**

1. An IC (integrated circuit) for electro-optical multiplex/-demultiplex operation at high data rates comprising:

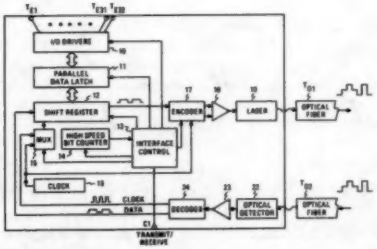
A. a substrate for the IC of GaAs;

B.
1. a plurality of parallel, electrical, IC input/output terminals on said substrate;
2. a serial, optical IC output port on said substrate adapted to be coupled to a first, output, opticla fiber; and
3. a serial, optical, IC input port on said substrate adapted to be coupled to a second input, optical fiber;

C. an electrical converter for binary data having a parallel to serial multiplex mode, and a serial to parallel demultiplex mode, integrated on said substrate and having parallel input/output terminals for data exchange in both modes coupled to said parallel IC terminals, a serial output terminal for transmission of a serial data stream in the multiplex mode, and a serial input terminal for reception of a seral data stream in the demultiplex mode;

D. an electrical encoder integrated on said substrate, coupled to the serial output terminal of said converter for converting said serial binary output data stream in the multiplex mode to a self-clocking three-level coded format in which each transition defines both a data bit and a clocking instant, requiring a minimum increase in bandwidth in transmitting and decoding both data and clocking over that required for data alone;

E. a diode laser integrated on said substrate forming said optical IC output port, said laser being amplitude modulated in the multiplex mode by said encoder in three levels to transmit a self-clocking serial optical data stream at said high data rate, the biasing of said diode permitting lasing at each level.



F. an electrical clocking oscillator integrated on said substrate having its output coupled to said converter and to said encoder to clock to optical, IC output in the multiplex mode;

G. an opticla detector integrated on said substrate forming said optical, IC input port, consisting of an optical field effect transistor exhibiting gain, said detector in the demulitplex mode converting a received, three-level coded, serial optical data stream to a like coded serial electrical data stream; and

H. an electrical decoder integrated on said substrate for converting said detected three-level coded data stream to a digital format, and for recovering the clocking accompanying said received data stream;

said decoded received serial data stream being coupled to said converter serial input terminal and appearing in a parallel format at said converter parallel input/output terminals and at said parallel electrical IC input/output terminals in the demultiplex mode, said IC output data stream being clocked at said recovered clocking rate.

4,703,472
WAVELENGTH MULTI/DEMULTIPLEXER

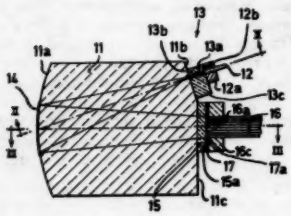
Martin Blumentritt, Königsbronn; Alfred Reüle, Aalen, and Reinhold Bittner, Mögglingen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,343
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509132
Int. Cl.[4] H04B 9/00
U.S. Cl. 370—3 **13 Claims**

1. A wavelength multi/demultiplexer comprising:
- a plurality of light-conducting fibers having respective coupling surfaces;
- a transparent supporting block having a diffraction grating and at least one coupling surface for operatively connect-

ing said light-conducting fibers with said supporting block;

a perforated plate made of photographically etchable material defining a plurality of photographically-etched bores for fixedly accommodating selected ones of said light-conducting fibers therein and having a surface facing toward said coupling surface of said supporting block and extending transversely to said fibers;



said surface of said perforated plate and the coupling surfaces of the light-conducting fibers mounted in said plate being conjointly processed to define a flush surface; and,

said perforated plate and the light-conducting fibers mounted therein being operatively connected to said coupling surface of said supporting block.

4,703,473

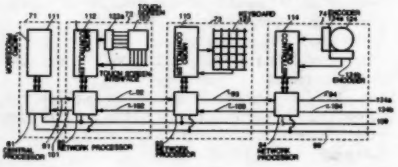
SERIAL NETWORK ARCHITECTURE FOR USER ORIENTED DEVICES

Nathanael T. Caine, Sunnyvale, Calif., and Jean-Jacques Simon, Saint-Egreve, France, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 625,944, Jun. 29, 1984, abandoned. This application May 5, 1986, Ser. No. 861,650

Int. Cl.[4] H04J *1/16, 3/16;* **H04B** *3/46*

U.S. Cl. 370—15 **8 Claims**



1. A serially expandable network for a computing system, the network comprising:

a plurality of devices, coupled together serially, having a first device, a last device and a next-to-last device, the last device being coupled only to the next-to-last device, and the last device having addition means for coupling an additional device to the serially expandable network without decoupling the last device from the next-to-last device;

a central computing device, coupled to the plurality of devices only at the first device in the plurality of devices;

a first outgoing data path on which data flows from the central computing device to the first device;

a next-to-last outgoing data path on which data flows to the next-to-last device;

a last outgoing data path on which data flows from the next-to-last device to the last device;

a last return data path on which data flows from the last device to the next-to-last device;

a next-to-last return data path on which data flows from the next-to-last device; and,

a first return data path on which data flows from the first device to the central computing device.

wherein the next-to-last device electrically isolates the next-to-last outgoing data path from the last outgoing data path so that when the next-to-last device receives data on the next-to-last outgoing data path, the next-to-last device may forward the data to the last outgoing data path without forwarding the data to the next-to-last return path, and may forward the data to the next-to-last return path without forwarding the data to the last outgoing data path.

4,703,474

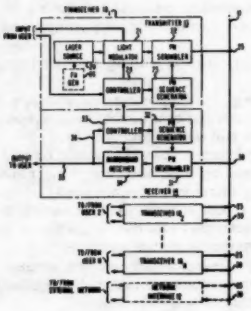
SPREAD SPECTRUM CODE-DIVISION-MULTIPLE-ACCESS (SS-CDMA) LIGHTWAVE COMMUNICATION SYSTEM

Gerard J. Foschini, Sayreville, and Giovanni Vannucci, Middletown, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 28, 1986, Ser. No. 834,346

Int. Cl.[4] H04B *9/00;* **H04J** *13/00*

U.S. Cl. 370—18 **15 Claims**



1. An optical transmitter comprising:

an input terminal receiving either one of an analog or digital signal from a user associated with the optical transmitter;

an output terminal for connection to a lightwave waveguide arrangement of an optical communication system;

a single frequency laser source (20) for generating a lightwave carrier signal at an undetermined wavelength;

means (21) for modulating the lightwave carrier signal from the laser source with the analog or digital signal received at the input terminal to generate a lightwave signal with a narrowband optical spectrum; and

means (22, 23) for spreading the optical spectrum of a lightwave signal using a predetermined, reiterative encoding sequence such that a lightwave output signal at the output terminal of the optical transmitter has an optical spectrum which is wider than the spectrum that the lightwave signal would have in the absence of the spreading means.

4,703,475

DATA COMMUNICATION METHOD AND APPARATUS USING MULTIPLE PHYSICAL DATA LINKS

Ellen E. Dretzka, Naperville; Zoe S. Quan, Chicago, and Philip A. Schreiner, Naperville, all of Ill., assignors to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 4, 1985, Ser. No. 805,304

Int. Cl.[4] H04Q *11/04;* **H04J** *3/24*

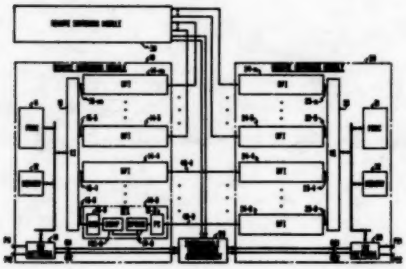
U.S. Cl. 370—60 **32 Claims**

1. A method of conveying information via a plurality of logical channels from a source to a destination having multiple physical links interposed therebetween, said method comprising

packetizing said information into a plurality of packets each including therein a definition of one of said logical channels and a definition of a logical channel sequence number with respect to the defined logical channel,

transmitting said plurality of packets over said links in such manner that ones of the packets defining the same logical channel are transmittable over different ones of said links,

separating a plurality of packets received on said links, according to logical channels defined therein, and



communicating said separated packets to said destination in a defined ordered sequence according to logical channel sequence numbers defined therein, and

wherein said communicating step comprises communicating said separated packets receivable from said links in an ordered sequence different from said defined ordered sequence.

4,703,476

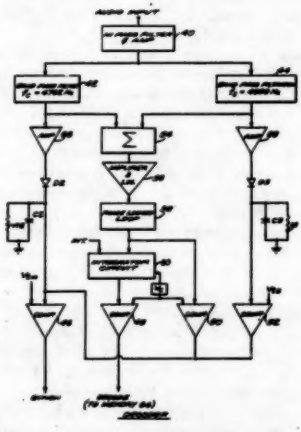
ENCODING OF TRANSMITTED PROGRAM MATERIAL

Jonathan M. Howard, Easthampton, N.Y., assignor to Audicom Corporation, New York and Bidco Inc., Hicksville, both of, N.Y.

Continuation of Ser. No. 533,193, Sep. 16, 1983, abandoned. This application Nov. 6, 1986, Ser. No. 926,890

Int. Cl.[4] H04J *1/02*

U.S. Cl. 370—76 4 Claims



1. In a system for accompanying audio program material with a substantially inaudible audio frequency secondary message signal, the secondary message signal including an initial portion and a multi-bit code portion having mark bits within a first frequency band and space bits within a second frequency band, said first frequency band occupying a first notch in the frequency band of the audio program material and said second frequency band occupying a second notch in the frequency band of the audio program material, the decoder comprising:

a first bandpass filter substantially centered on the center frequency of said first notch, said first bandpass filter being coupled to at least a portion of the audio program material to provide an output signal comprising primarily the mark bits,

a second bandpass filter substantially centered on the center frequency of said second notch, said second bandpass filter being coupled to at least a portion of the audio program material to provide an output signal comprising primarily the space bits,

said first and second bandpass filters covering separate frequency bands, spaced from one another,

a summing circuit for adding the outputs of said first and second filters,

a converter coupled to the output of said summing means and responsive to the frequencies of said mark and space bits to provide a first voltage in response to said mark bit and a second voltage different from said first voltage in response to said space bit,

a first comparator circuit responsive to the output of said first bandpass filter to provide a first enabling signal in response to an output from said first bandpass filter that exceeds a first threshold,

said first threshold being set below the signal level to be expected from said first bandpass filter during the receipt of a mark bit.

4,703,477

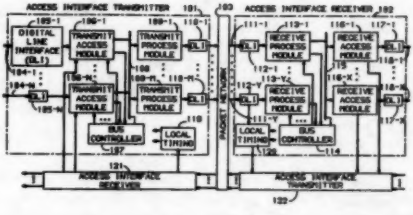
PACKET INFORMATION FIELD DATA FORMAT

Harry W. Adelmann, Neptune, and Jame D. Tomcik, Aberdeen, both of N.J., assignors to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 28, 1986, Ser. No. 834,615

Int. Cl.[4] H04J *3/24*

U.S. Cl. 370—94 23 Claims



1. Apparatus for generating a packet including an information field having a plurality of bit positions and a header having a plurality of bit fields comprising,

means for supplying digital samples having a plurality of bits, said samples being in a repetitive frame,

means for grouping similar bits from individual ones of said samples representative of a corresponding communication channel from a plurality of said repetitive frames and inserintg and grouping of similar bits in said packet information field,

means for generating first indication whether bits can be removed from the bit positions in said packet information field, and

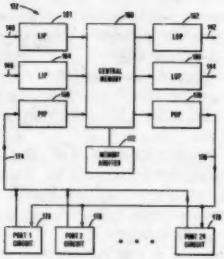
means for inserting said first indication into a prescribed bit field in said packet header.

4,703,478

BURST-SWITCHING METHOD FOR AN INTEGRATED COMMUNICATIONS SYSTEM

E. Fletcher Haselton, Waltham; Stanford A. Amstutz, Andover, and Joseph M. Lenart, Arlington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 2, 1985, Ser. No. 762,594
Int. Cl.[4] H04J 3/24
U.S. Cl. 370—94 26 Claims



1. In a communications system comprising:

(a) a plurality of switches, each switch having processing means;

(b) at least one communications link, there being one such link between any two of said switches which have the ability to communicate with each other without the communication passing through an intermediary switch, each link having an effective transmission rate of at least 1.544 million information-bearing bits per second, each link being time-divided with a plurality of frames within each second of time, each frame having a plurality of channels, each channel having communications capacity for the transmission of one byte, a byte being a predetermined number of bits, a bit being one binary digit; and

(c) a plurality of ports, each port being a component of one of said switches, each port providing means for coupling with a control processor, an end-user instrument, or another communications system, said coupling being made via a port-interface circuit;

a method of routing a burst through a switch to an outgoing link of said switch, said burst being a plurality of bytes including a destination-port address, an information portion, and a termination portion at the end of said burst, said outgoing link of said switch leading toward the destination port of said burst, said method comprising the steps of:

(a) receiving the first byte of said burst;

(b) determining, if possible, said outgoing link of said switch on which said burst will be transmitted;

(c) receiving the second or a successive byte of said burst;

(d) in the event said outgoing link of said switch has not yet been determined, then determining said outgoing link on which said burst will be transmitted;

(e) receiving the last byte of said burst;

(f) after reception of the first byte of said burst and also after making a determination of said outgoing link of said switch on which said burst will be transmitted, then transmitting said first byte in the first available channel of a first frame of said outgoing link and assigning said channel to said burst;

(g) after transmission of said first byte of said burst, transmitting said second or successive byte of said burst in said assigned channel of the second or successive frame of said outgoing link; and

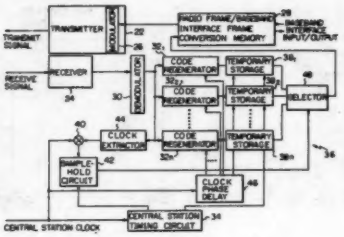
(h) after transmission of said last byte of said burst, releasing said assigned channel for possible assignment to another burst in the frame immediately following said transmission of said last byte.

4,703,479

MULTI-DIRECTION TIME DIVISION MULTIPLEX COMMUNICATION APPARATUS

Kiyoshi Ikeda, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Nov. 12, 1985, Ser. No. 796,857
Claims priority, application Japan, Nov. 15, 1984, 59-240994
Int. Cl.[4] H04J 3/06
U.S. Cl. 370—104 1 Claim



1. A multi-direction time division multiplex communication apparatus for a central station in a multi-direction time division multiplex communication system in which the central station transmits signals meant for each of satellite stations in a time division multiplex broadcast mode, while each of the satellite stations after extraction of a clock extracts the signal meant for the own station and intermittently transmits signals from the own station after adjusting the signals to such a timing that, when the signals from the own station reach the satellite station, the signals do not overlap with signals reaching the central station from the other satellite stations and appear as orderly as a single sequence of time division multiplex signals, said apparatus comprising:

a demodulator for demodulating a received signal which is transmitted from any of the satellite stations;

a plurality of code regenerator circuits each for producing a digital signal by identifying a ONE and a ZERO of an output of said demodulator which is a digital signal;

a plurality of temporary storages associated in one-to-one correspondence with said code regenerator circuits for temporarily storing an output of the associated code regenerator circuit;

a clock phase delay unit for producing a plurality of clock signals each of which is delayed in phase to a degree different from the others relative to a clock timing of a central station clock signal, which is applied to said clock phase delay unit, said clock signals having different timings being applied as decision clock signals to the code regenerator circuits in one-to-one correspondence;

a clock extractor circuit for extracting a received clock signal from the output of the demodulator;

a phase comparator for comparing a phase of an output clock signal of said clock extractor circuit with a phase of the central station clock signal;

a sample-hold circuit for sample-holding an output of said phase comparator burst by burst; and

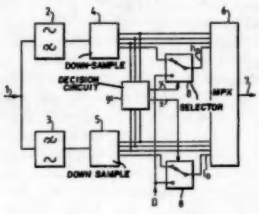
a selector circuit for selecting an output of one of the temporary storages which has the smallest error rate responsive to an output of said sample-hold circuit.

4,703,480

DIGITAL AUDIO TRANSMISSION

Frederick A. Westall; Dominic S. Lee, both of Ipswich; Ian R. Cameron, Lillington, and Robert W. McLintock, Nr. Sevenoaks, all of England, assignors to British Telecommunications plc, Great Britain

Filed Nov. 16, 1984, Ser. No. 672,232
Claims priority, application United Kingdom, Nov. 18, 1983, 83-30885
Int. Cl.[4] H04J *3/12*; G10L *3/02*
U.S. Cl. 370—111 38 Claims



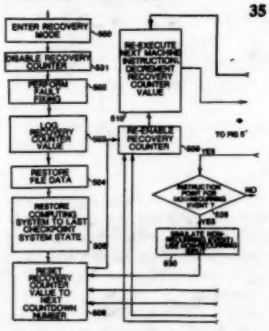
1. A method of sub-band coding for transmitting signals from a transmitter to a receiver comprising the steps of (a) dividing an input signal into two or more sub-bands, (b) representing each sub-band by a sequence of digital words each having a plurality of bits, (c) selecting all but at least one of the least significant of each of said digital words from each sub-band to be always transmitted bits, (d) adaptively allocating the number of bits to each sub-band solely as a function of said always transmitted bits, and (e) transmitting said always transmitted bits plus any additionally allocated bit or bits, whereby the coded signal may be decoded at a receiver by reference only to said always transmitted bits.

4,703,481

METHOD AND APPARATUS FOR FAULT RECOVERY WITHIN A COMPUTING SYSTEM

Michael J. Fremont, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 16, 1985, Ser. No. 766,212
Int. Cl.[4] G06F *11/14*
U.S. Cl. 371—12 35 Claims


ENTER RECOVERY MODE
DISABLE RECOVERY COUNTER
PERFORM FAULT FIXING
LOG RECOVERY COUNTER VALUE
RESTORE FILE DATA
RESTORE COMPUTING SYSTEM TO LAST CHECKPOINT SYSTEM STATE
REJECT RECOVERY COUNTER VALUE TO NEXT COUNTDOWN NUMBER
RE-EXECUTE NEXT MACHINE INSTRUCTION; DECREMENT RECOVERY COUNTER VALUE
RE-ENABLE RECOVERY COUNTER
INSTRUCTION POINT FOR RECHECKPOINTING (PART 1)
YES
NO

1. A method of preparing for recovery from a fault detected within a computing system, said method comprising the steps of:

recording a checkpoint system state of the computing system at a first checkpoint;

counting machine instructions executed after recording the checkpoint system state; and,

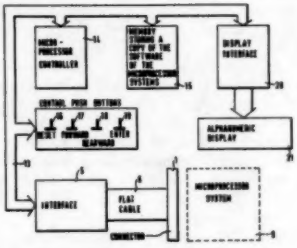
logging determining event information for a handling of a determining event.

4,703,482

UNIVERSAL APPARATUS FOR DETECTING FAULTS IN MICROPROCESSOR SYSTEMS

Jean Auger, Chomedey, and Donald Laflamme, Repentigny, both of Canada, assignors to Hydro-Quebec, Montreal, Canada

Filed May 30, 1986, Ser. No. 868,444
Claims priority, application Canada, Feb. 19, 1986, 502236
Int. Cl.[4] G01R *31/28*; G06F *11/00*
U.S. Cl. 371—16 20 Claims



1. An apparatus for detecting a fault in a system including a microprocessor, said microprocessor comprising a plurality of pins individually connected to the system through a connection device, said detecting apparatus comprising:

a connector provided with pins so positioned that they can be individually connected to the system through said connection device, in the place of the pins of the microprocessor after the latter has been withdrawn from the system;

an interface defining for each pin of said connector a line connected to this pin and having a programmable direction; and

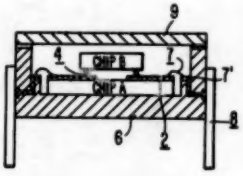
control means connected to the interface for (a) programming the direction of the lines defined by said interface in order to simulate by means of these lines interconnections which are normally established between the system and its microprocessor, and (b) carrying out tests on the microprocessor system through the interconnections simulated by the interface for detecting the fault in said system.

4,703,483

CHIP ON CHIP TYPE INTEGRATED CIRCUIT DEVICE

Yoshinori Enomoto; Hideo Monma, both of Kawasaki; Shunzo Ohta, Aizuwakamatsu, and Takeshi Sasaki, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 26, 1985, Ser. No. 759,448
Claims priority, application Japan, Jul. 27, 1984, 59-156618; Nov. 16, 1984, 59-241977
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—24 17 Claims



1. A chip on chip type integrated circuit device which includes a circuit for checking the integrity of each of a plurality of electrical interconnections formed between upper and lower

chips of said chip on chip type integrated circuit device, each said chip comprising a logic circuit having plurality signal terminals and plural bonding pads respectively corresponding to said plural signal terminals, each said interconnection being formed between a respectively corresponding pair of associated bonding pads of said upper and lower chips for completing a signal path therebetween, said device comprising:

said lower chip comprising:

plural selection means for respectively connecting said plural signal terminals and said respectively corresonding, plurality bonding pads of said upper chip to said respectively corresponding bonding pads thereof, and a checking mode for isolating said respective signal terminals from said respectively corresponding bonding pads thereof;

means for applying a control signal to said selection means for switching said selection means selectively to one of said normal operating mode and said checking mode thereof;

means for applying test signals to said selection means, each said selection means, in said checking mode thereof, transmitting test signals applied thereto to said bonding pad respectively corresponding thereto;

said upper chip comprising:

a terminal connected to said bonding pads thereon, of said pairs of associated bonding pads, receiving test signals transmitted by said selection means associated with said lower chip and conducted through said signal paths completed by said electrical interconnections formed between said pairs of associated bonding pads and producing outputs corresponding to the test signals, as received through said completed signal paths; and

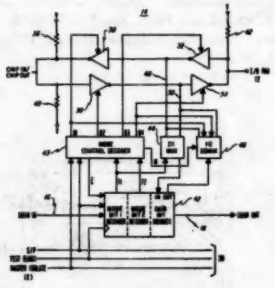
means responsive to the outputs produced by said receiving terminal, and including a detection terminal formed on said lower chip and a return signal path extending from said signal receiving means of said upper chip to said detection terminal on said lower chip for determining the integrity of the respectively corresponding interconnections and providing an output indicating the results of the integrity determination for each such interconnection at said detection terminal.

4,703,484

PROGRAMMABLE INTEGRATED CIRCUIT FAULT DETECTION APPARATUS

Robert M. Rolfe, Melbourne, and Lee J. Falkenstrom, Indialantic, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Dec. 19, 1985, Ser. No. 810,941
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—25 **15 Claims**



1. An integrated circuit fault detection system wherein the integrated circuit has functional input terminals, functional output terminals, and a plurality of bonding pads, said integrated circuit fault detection system comprising:

first gate means having a bidirectional terminal adapted for connection to a bonding pad, a data output terminal adapted for connection to a functional input terminal, a test input terminal adapted for receiving input test data, and a test output terminal adapted for providing resultant test data, wherein the data path through said first gate means is selectable, and wherein during normal operation data at the bonding pad is supplied to the functional input terminal via said bidirectional terminal and said data output terminal, and wherein in a first fault testing mode test data from said test input terminal is selectably provided to one of the bonding pad and the functional input terminal, and wherein in a second fault testing mode test data at the bonding pad is selectably supplied to one of said functional input terminal and said test output terminal;

second gate means having a data input terminal adapted for connection to a functional output terminal, a bidirectional terminal adapted for connection to a bonding pad, a test input terminal adapted for receiving input test data, and a test output terminal adapted for providing resultant test data, wherein the data path through said second gate means is selectable, and wherein during normal operation data at the functional output terminal is supplied to the bonding pad via said data input terminal and said bidirectional terminal, and wherein during a first fault testing mode test data is selectably supplied to the bonding pad from one of said test input terminal and the functional output terminal, and wherein during a second fault testing mode test data is selectably supplied from one of the bonding pad and the functional output terminal to said test output terminal; and

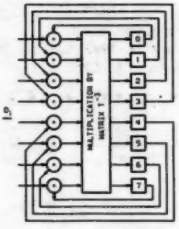
controller means for controlling said first and said second gate means to select the data path therethrough.

4,703,485

METHOD AND APPARATUS FOR COMPUTING AND IMPLEMENTING ERROR DETECTION CHECK BYTES

Arvind M. Patel, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 10, 1986, Ser. No. 828,101
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—37 **32 Claims**



1. Apparatus for generating a plurality of CRC check bytes for a variable-length record having error correction check bytes and correction capability, said apparatus comprising:

(a) first means for sequentially receiving all data bytes in the record including all error correction check bytes inserted into the record at preselected intervals having m_1 bytes therein and for multiplying the received contents, as such contents are received by a matrix of the form T^{-n}, where $-n$ is an integer and different from any integer used for computing the error correction check bytes, to produce a first designated preselected number of CRC check bytes;

(b) second means for sequentially receiving all data bytes in the record including all error correction check bytes corresponding to the sequence received by the first means but excluding said error correction check bytes corresponding to a preselected number of check byte positions from the end of each interval except the last interval and

for multiplying the last mentioned received contents, as such contents are received by a matrix of the form $T^{-(s+1)}$ to produce a second designated preselected number of CRC check bytes; and

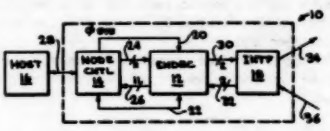
(c) means for combining the outputs of the first and second means, in a preselected sequence into said plurality of CRC check bytes.

4,703,486

COMMUNICATION DATA ENCODER/DECODER COMPONENT SYSTEM ARCHITECTURE

Gerald L. Benis, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 18, 1984, Ser. No. 683,281
Int. Cl.[4] H04L 1/00; G08C 25/00
U.S. Cl. 371—41 25 Claims



21. A code conversion system for use in a local area network for converting an asynchronous stream of data between first and second sets of data codes, said data asynchronous stream being subject to a data fault condition, said system comprising:

(a) means for detecting the occurrence of said fault condition;

(b) means for code converting the data of said asynchronous data stream from said first set of data codes to said second set of data codes; and

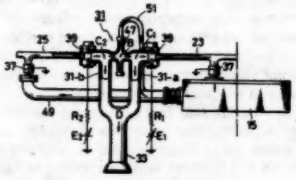
(c) means, responsive to said detecting means, for selectively altering the code conversion performed by said converting means to convert a data code of said first set of data codes to an alternate data code of said second set of data codes to reflect the occurrence of said fault condition in said asynchronous data stream.

4,703,487

DEVICE FOR SUPPRESSING ELECTRICAL DISCHARGES BETWEEN CATHODES OF LASER OSCILLATOR

Ryoji Koseki, Buena Park, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.

Filed Aug. 13, 1985, Ser. No. 765,103
Int. Cl.[4] H01S 3/00
U.S. Cl. 372—33 10 Claims



1. A gas laser oscillator comprising:

a plurality of laser tubes which are disposed in a straight line in a manner such that a plurality of cathodes are arranged adjacent one another to form a gap between said cathodes, said laser tubes communicating with each other at abutted ends of said laser tubes;

means for supplying a laser gas into said laser tubes, said gas supply means having a heat exchanger to cool the laser gas;

means for exhausting the laser gas from said laser tubes, said exhausting means provided near the cathodes;

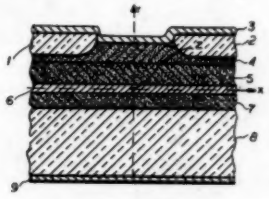
means connected to said gap for injecting non-ionized gas directly into the gap between the adjacent cathodes.

4,703,488

SEMICONDUCTOR LASERS

Pietro Di Vita, Turin, and Marcello Potenza, Genoa, both of Italy, assignors to Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A., Torino, Italy

Filed Sep. 24, 1985, Ser. No. 779,788
Claims priority, application Italy, Nov. 13, 1984, 68133 A/84
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—44 5 Claims



1. A semiconductor laser, comprising:

a substrate;

a plurality of differently doped semiconductor layers on said substrate together defining an active layer which receives light radiation in a direction which is parallel to said active layer for light amplification by laser action in said active layer;

means for injecting charge carriers into said active layer; and

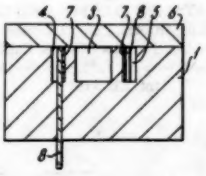
means for confining said charge carriers to a central zone of said active layer by applying a magnetic field parallel to said direction of light radiation and with opposite directions in two half regions of said active layer separated by a plane parallel to said direction of light radiation, perpendicular to said semiconductor layers and traversing said active layer medianly.

4,703,489

WAVEGUIDE LASER

Iain E. Ross, Newport-on-Tay, Scotland, assignor to Ferranti, plc, Gatley, Cheadle, England

Filed Feb. 13, 1985, Ser. No. 701,158
Claims priority, application United Kingdom, Feb. 18, 1984, 8404310
Int. Cl.[4] H01S 3/03
U.S. Cl. 372—64 18 Claims



1. A transversely-excited waveguide laser which includes a first block of electrically-insulating material in one face of which are formed three parallel elongated slots, a layer of electrically-conducting material covering at least one face of each of the two outer slots to form an electrode, an electrical conductor connected to each of said conducting layers, and a second block of electrically-insulating material attached to said first block so as to close at least the centre one of the slots

formed therein, the centre slot when so closed having dimensions which enable it to form a laser cavity which will support waveguide laser action.

4,703,490

TRANSVERSELY EXCITED GAS LASER AND METHOD FOR THE OPERATION THEREOF

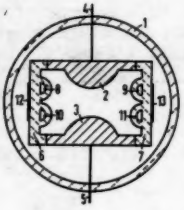
Gerhard Brumme, Eching, and Konrad Paur, Ottobrunn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 15, 1985, Ser. No. 787,070

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1984, 3437738

Int. Cl.[4] H01S *3/097*

U.S. Cl. 372—86 **15 Claims**



1. A transversely excited gas laser containing an elongated, gas-filled discharge chamber having

(a) two optical elements which are situated at two end faces of said chamber and lie on an optical axis,

(b) first and second main electrodes disposed in said chamber extending along said optical axis, said optical axis proceeding in a main discharge space between said first and second main electrodes,

a drive unit with which, during operation of the laser,

(a) said first and second electrodes are applied to such different potentials that main electrical discharge occurs between them in a main discharge space;

the improvement comprising:

at least two auxiliary electrode pairs disposed in said chamber extending parallel to said optical axis; and

a dielectric jacket surrounding said at least two auxiliary electrode pairs and common to two of said auxiliary electrodes and having a profile forming a channel-type constriction between said two auxiliary electrodes of every auxiliary electrode pair, said channel-type constriction facing said main discharge space to direct a shaped discharge into said main discharge space.

4,703,491

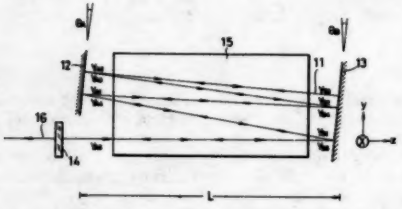
OPTICAL SYSTEM FOR FOLDED CAVITY LASER

Gnian C. Lim, Los Angeles, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.

Filed Nov. 27, 1985, Ser. No. 802,379

Int. Cl.[4] H01S *3/081*

U.S. Cl. 372—93 **6 Claims**



1. An optical system for a folded cavity laser comprising:

an active laser medium;

a partially transmitting output mirror disposed on a first side of the laser medium, a surface of the output mirror facing the laser medium and a line normal thereto defining a Z-axis of the optical system;

a single first mirror disposed on said first side of the output mirror with respect to said laser medium, said first mirror comprising a flat folding mirror, a surface of first flat folding mirror facing said laser medium and tilted about an X-axis by an angle θ_A with respect to a Y-axis, wherein the X- and Y-axes are perpendicular to the Z-axis and also to each other;

a single second mirror disposed on a second side opposite said first side of said output mirror with respect to said laser medium, said second mirror comprising a flat folding mirror, a surface of said second flat folding mirror facing said output mirror and said first flat folding mirror through said laser medium and tilted about said X-axis by an angle θ_B with respect to said Y-axis in a manner such that the angles θ_A and θ_B approximately satisfy a relation $\theta_A/\theta_B=N/N-1$ wherein N is a positive interger; and

means for tilting the face of said output mirror about said X-axis so that the relation $\theta_A/\theta_B=N/N-1$ is precisely satisfied.

4,703,492

JOINED CARBON ELECTRODES AND METHOD FOR THE JOINING THEREOF

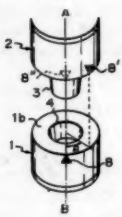
Yoshishige Sekiguchi, and Tomiyasu Kubota, both of Nagano, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 3, 1984, Ser. No. 637,254

Claims priority, application Japan, Aug. 24, 1983, 58-129775[U]

Int. Cl.[4] H05B *7/14*

U.S. Cl. 373—91 **8 Claims**



1. Joined carbon electrodes for an electric arc furnace comprising:

first and second carbon electrodes each having a circumferential surface and an end surface disposed in contact with each other at their respective end surfaces;

first and second sockets formed in the end surface of each of said first and second carbon electrodes and having first and second screw threads having top ends disposed adjacent said end surfaces respectively; and

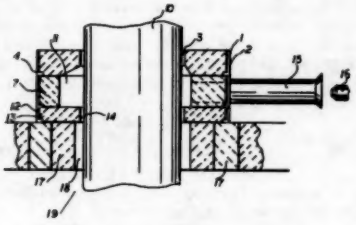
a nipple for securing said first and second carbon electrodes together wherein said nipple is provided with screw thread means on an outer surface thereof and is disposed in threaded engagement with the socket of said first and second carbon electrodes with the top end of said first screw thread coinciding with the top end of said second screw thread to form a single continuous screw thread in said first and second sockets and wherein first and second marks are located on the circumferential surface of said first and second carbon electrodes, respectively, at the same circumferential positions relative to the top ends of said first and second screw threads, respectively, whereby said first and second marks will coincide with one another when the top ends of the first and screw threads coincide with one another.

4,703,493

SEAL FOR AN ELECTRODE HOLE IN AN ELECTRIC ARC FURNACE

Nikolay G. Bakalov; Peayo I. Penev; Ivan K. Ivanov; Velyo T. Velev; Peter H. Savov, and Alexander Y. Vulchev, all of Sofia, Bulgaria, assignors to Npp Po Elektrotermia, Sofia, Bulgaria

Filed Aug. 4, 1986, Ser. No. 892,943
Int. Cl.[4] H05B 7/12
U.S. Cl. 373—95 5 Claims



1. A sealing device for a hole in a roof of an electric furnace adapted to be traversed by an electrode, said device comprising:

an annular central body comprised of a metal shell, and a mass of a high-alumina material with an Al_2O_3 content in excess of 80% and selected from the group which consists of a refractory cement with an Al_2O_3 content in excess of 80% cast and vibrated into said shell and dried therein at a temperature of substantially 150° C. to 220° C., and a high-alumina ramming mass together with a phosphoric acid or phosphate compound binder compacted into said shell and dried therein at a temperaure of subsantially 150° C. to 220° C., said mass of high-alumina material defining a chamber with said electrode above said roof and being formed with a laterally projecting boss provided with a lateral passage communicating with said chamber;

an annular cover body closing the top of said chamber, defining an annular gap with said electrode such that a gas fed to said chamber passes out of said gap while maintaining a pressure in said chamber sufficient to block passage of furnace gas through said hole, and comprised of a metal shell, and a mass of a high-alumina material with an Al_2O_3 content in excess of 80% and selected from the group which consists of a refractory cement with an Al_2O_3 content in excess of 80% cast and vibrated into said shell of said cover body and dried therein at a temperature of substantially 150° C. to 220° C., and a high-alumina ramming mass together with a phosphoric acid or phosphate compound binder compacted into said shell of said cover body and dried therein at a temperature of substantially 150° C. to 220° C.; and

a metal duct communicating with said passage and terminating at boss of said high-alumina material of said central body for supplying the gas fed to said chamber to said passage.

4,703,494

PCM SIGNAL TRANSMISSION SYSTEM

Minoru Ozaki, and Kunimaro Tanaka, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP83/00059, § 371 Date Mar. 8, 1984, § 102(e) Date Mar. 8, 1984, PCT Pub. No. WO84/03404, PCT Pub. Date Aug. 30, 1984
PCT Filed Feb. 28, 1983, Ser. No. 589,115
Int. Cl.[4] H04L 25/34, 25/49, 7/06
U.S. Cl. 375—19 21 Claims

1. A system for transmitting PCM signals comprising means for transmitting PCM signals modulated according to a specified rule of modulation and for providing for every given period of time in said signals a synchronizing interval violating

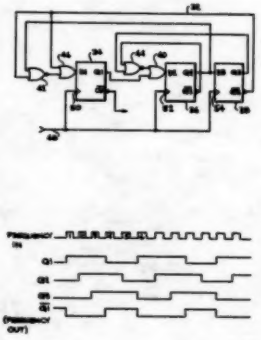
said modulation rule, and means for including in said signals a level reversal interval following said synchronizing interval.

4,703,495

HIGH SPEED FREQUENCY DIVIDE-BY-5 CIRCUIT

Bradley J. Berezsak, Sunnyvale, Calif., assignor to Advanced Micro Device, Inc., Sunnyvale, Calif.

Filed May 23, 1986, Ser. No. 866,828
Int. Cl.[4] H03K 23/70
U.S. Cl. 377—108 6 Claims



1. A high-speed frequency divide-by-5 circuit comprising:

a first flip-flop means having a data input, a clock input, and at least one output;

a second flip-flop means having a clock input, a data input, and at least one output, said data input being coupled to said at least one output of said first flip-flop means;

a third flip-flop means having a data input coupled to said at least one output of said second flip-flop means, a clock input and at least one output said at least one output of said third flip-flop means being coupled to the data input of said second flip-flop means;

a first OR gate coupled between said at least one output of said first flip-flop means and said data input of said second flip-flop means;

a first NOR gate coupled to a first input of said first OR gate, said first NOR gate also having a first input coupled to a second output of said second flip-flop means, and a second input coupled to said at least one output of said third flip-flop means, said first OR gate also having a second input coupled to said at least one output of said first-flop means; and

a means for simultaneously providing clock pulses to each of said clock inputs of said first, second and third flip-flop means; and

such that when a first clock pulse is simultaneously transmitted to each of said clock inputs, logic signals at the at least one output of said first, second and third flip-flop means are, respectively, a logical one, a logical zero and a logical zero,

and when a second clock pulse is simultaneously transmitted to each of said clock inputs, the at least one output of said second flip-flop means changes state to a logical one,

and when a third clock pulse is simultaneously transmitted to each of said clock inputs, the at least one output of said third flip-flop means changes state to a logical one,

and when a fourth clock pulse is simultaneously transmitted to each of said clock inputs, the at least one output of said first flip-flop means changes state to a logical zero,

and when a fifth pulse is simultaneously transmitted to each of said clock inputs, the at least one output of said second flip-flop means changes state to a logical zero; and

when a sixth clock pulse is simultaneously transmitted to said clock inputs, the at least one outputs of said first and third flip-flop means change state to a logical one and a logical zero, respectively, returning the circuit to the original output state of the first clock pulse.

4,703,496

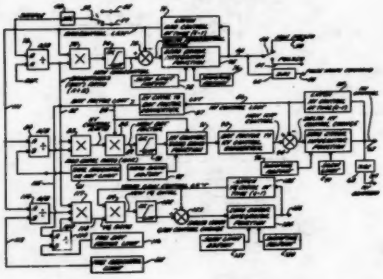
AUTOMATIC X-RAY IMAGE BRIGHTNESS CONTROL

Thomas V. Meccariello, Waukesha, and Gary F. Relihan, Nashotah, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 814,902, Dec. 30, 1985. This application Jan. 22, 1987, Ser. No. 8,089

Int. Cl.[4] H05G *1/64*

U.S. Cl. 378—99 **14 Claims**



3. In a fluoroscopic system comprised of an x-ray tube having an anode, a cathode and a control electrode, current regulator circuitry for controlling of the average current (mA) flowing between the anode and cathode of the tube during an x-ray exposure sequence, an x-ray image intensifier operative to convert an x-ray image produced by said tube to optical images, video camera means for converting said optical images to analog video signals, gain control means for said video camera, a video monitor for translating said visible signals to a visible image, kilovoltage regulating circuit means for controlling the kilovoltage (kV) applied to said anode of said x-ray tube, and means for controlling image brightness continuously, said image brightness control means comprising:

detector means operative to produce a brightness signal (B) representative of image brightness during a sampling period at time (t),

means for producing a reference signal (A), corresponding to a desired brightness level,

a primary control loop including divider means having an output and inputs for said brightness signal and reference signal and being operative to take the ratio A/B to yield on its output a brightness ratio (BRT) signal where a ratio of other than a predetermined value is indicative of an error between sampled and desired brightness at time (t),

storage means having an output and an input for a radiation control last (RCL) signal for the preceding sample period which is a function of said BRT signal at time (t−1), namely, the time at which the image brightness was sampled next preceding the sample at time (t),

multiplier means having an output and having input means coupled to said storage means output and to said output of said divider means and operative to multiply said RCL signal and the BRT signal obtained at time (t) to yield a new radiation control signal representative of brightness at time (t),

means for subtracting said new radiation control signal from said RCL signal to produce an output signal corresponding to a radiation control signal for the sample at time (t),

means for coupling said output of said subtraction means to said input of the storage means to effect storage of said radiation control signal until the next brightness sampling period, and

means for supplying said radiation control signal to said mA regulator circuitry for said circuitry to respond by adjusting the average mA through said tube until said ratio of signals A to B attains said predetermined value indicative of no significant error between sampled and reference brightness at time (t).

4,703,497

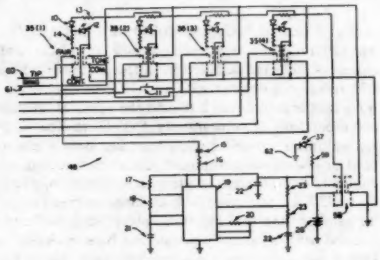
FOUR PAIR CABLE TEST SET

David L. Ingalsbe, Norfolk, Nebr., assignor to Independent Technologies, Inc., S. St. Paul, Minn.

Filed Mar. 31, 1986, Ser. No. 846,347

Int. Cl.[4] H04B *3/46*

U.S. Cl. 379—22 **12 Claims**



1. A unitary, compact and hand held four pair test device for use on communication interconnect cabling or wire configurations, said cable and said wire configurations being double ended, terminated or unterminated, either working or nonworking, and for use on the communication systems which are connected thereby to test four individual ring and tip conductor pairs either individually or simultaneously for line status, continuity and polarity, comprising:

(a) four line pair paths, each said line pair path establishing a current path between one of said ring and tip conductor pairs through first switching means in series with a tri-state, bi-directional LED, and a first load resistor;

(b) four tone paths, each said tone path establishing a current path between one of said ring and tip conductor pairs through said first switching means, said tone paths further establishing a current path through series capacitance and resistance means, a tone generator source, second switching means, and a battery; and

(c) four continuity paths, each said continuity path establishing a current path between one of said ring and tip conductor pairs through said first switching means in series with said bi-directional LED, an isolation diode, and a second load resistor, said continuity paths further establishing a current path through said second switching means and said battery, whereby said second switching means cooperates with each said first switching means to provide a line pair path, tone path or continuity path to each said ring and tip conductor pair, either individually or simultaneously, and whereby communication system voltage across said ring and tip conductor pairs activates said bi-directional LEDs in said line pair paths, said tone paths provide an unattenuated tone signal through said

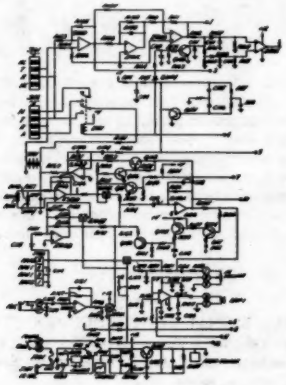
ring and tip conductor pairs either individually or simultaneously, and terminated ring and tip conductor pairs activate said bi-directional, LEDs in said continuity paths.

4,703,498

MESSAGE PLAYBACK CONTROL SYSTEM FOR TELEPHONE ANSWERING MACHINE

Raymond G. Bond, Long Beach, Calif., assignor to Fortel Corporation, Compton, Calif.

Filed Mar. 21, 1986, Ser. No. 842,675
The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.
Int. Cl.[4] H04M 1/65
U.S. Cl. 379—70 4 Claims



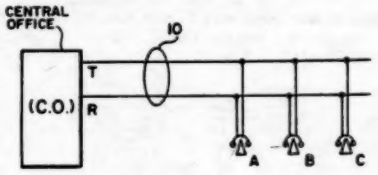
1. In a telephone answering machine which responds to telephone messages received over a telephone line when in an automatic answer mode, and which includes a mechanism for recording messages received over the telephone line on a magnetic tape, the combination of: a micro-computer; manually operated local swtich means connected to the micro-computer; circuit means connecting the micro-computer to the magnetic tape mechanism to cause the magnetic tape mechanism to rewind the magnetic tape in a reverse direction to a predetermined origin position when said local switch means is manually operated; further circuit means connecting the micro-computer to the magnetic tape mechanism to cause the magnetic tape mechanism automatically to move the magnetic tape in the forward direction after it has reached said predetermined origin position; control circuitry connected to the micro-computer for enabling the micro-computer to stop the forward motion of the magnetic tape mechanism after it has returned to the position at which said local switch means was manually operated and to set the telephone answering machine to said automatic answer mode; a sound transducer; circuit means connecting the magnetic tape mechanism to the sound transducer to cause the sound transducer to reproduce the messages recorded on the magnetic tape during the forward motion thereof; and further control circuitry connected to the micro-computer and to the magnetic tape mechanism to cause the magnetic tape to rewind for as long as said local switch means is actuated when said local switch means is actuated during the period when messages on the magnetic tape are being reproduced during the forward motion of the magnetic tape.

4,703,499

DISTRIBUTED PRIVACY ORIENTED TELEPHONE EXTENSION SYSTEM

Arturo Fossas, Miramar Ave. 706 Apt. 6, San Juan, P.R. 00907, and Orlando Ruiz, Z1-6, 18 St., Monte Carlo Rio Piedras, P.R. 00926

Filed Feb. 21, 1986, Ser. No. 831,558
Int. Cl.[4] H04M 1/70, 3/16
U.S. Cl. 379—194 23 Claims



13. A distributed privacy oriented telephone extension system including a plurality of extension phone units coupled to a telephone line, said system comprising:

a first privacy circuit coupled between a first phone unit and said telephone line; and

a second privacy circuit coupled between a second phone unit and said telephone line;

each of said first privacy circuit and said second privacy circuit including transmitter/receiver means for transmitting and receiving signals over the telephone line;

said transmitter/receiver means of said first privacy circuit including activation means selectively operable by a user after said first phone unit is placed in an off-hook condition for activating said first privacy circuit, the signal generating means responsive to activation of said first privacy circuit by the user after said first phone unit is placed in said off-hook condition for generating a first signal and for transmitting the first signal over said telephone line;

said transmitter/receiver means of said second privacy circuit being responsive to the first signal from said first privacy circuit for disconnecting said second phone unit from said telephone line;

said signal generating means of said transmitter/receiver means of said first privacy circuit being responsive to user activation, after said telephone line is placed in said off-hook condition and said second phone unit is disconnected, for generating a second signal and transmitting the second signal over said telephone line;

said transmitter/receiver means of said second privacy circuit being responsive to the second signal from said first privacy circuit for reconnecting said second phone unit to the telephone line;

said transmitter/receiver means of said second privacy circuit including activation means selectively operable by the user after said second phone unit is placed in said off-hook condition for activating said second privacy circuit, and signal generating means responsive to activation of said second privacy circuit by the user after said second phone unit is placed in said off-hook condition for generating a first signal and for transmitting the first signal over said telephone line;

said transmitter/receiver means of said first privacy circuit being responsive to the first signal from said second privacy circuit for disconnecting said first phone unit from said telephone line;

said signal generating means of said transmitter/receiver means of said second privacy circuit being responsive to user activation, after said telephone line is placed in said off-hook condition and said first phone unit is disconnected, for generating a second signal and for transmitting the second signal over the telephone line;

said transmitter/receiver means of said first privacy circuit being responsive to the second signal from said second privacy circuit for reconnecting said first phone unit to said telephone line.

4,703,500

POWER AMPLIFIER

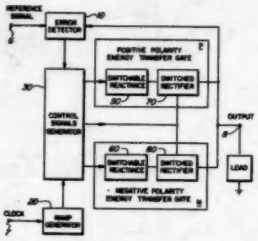
Brian J. Pollard, Watford, England, assignor to Northern Telecom Limited, Montreal, Quebec, Canada

Filed Jan. 30, 1986, Ser. No. 824,278

Claims priority, application Canada, Oct. 28, 1985, 493990

Int. Cl.[4] H04M *3/02*

U.S. Cl. 379—252 **10 Claims**



1. A power amplifier being energizable by a direct current supply for amplifying an input signal to provide an output signal, the power amplifier comprising:

positive and negative terminals for connection across the direct current supply;

positive polarity and negative polarity energy transfer gates being responsive to control signals, for storing electrical energy from the direct current supply and for subsequently releasing electrical energy to an output terminal, said energy transfer gates each comprising a switchable reactance circuit being responsive to a respective one of the control signals, and a switched rectifier for coupling electrical energy between the switchable reactance and the output terminal in response to another of the control signal;

a control circuit being responsive to the input signal and a potential amplitude appearing at the output terminal for generating said control signals to define which of either or neither of the positive polarity and negative polarity energy transfer gates is active and to regulate each quantity of electrical energy stored by an active one of the energy transfer gates;

whereby the output signal appears at the output terminal with an amplitude controlled in accordance with the input signal.

4,703,501

SOUND MULTIPLEX RECEIVER

Yoshiro Sugai, and Hiroyuki Kimura, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 19, 1986, Ser. No. 864,656

Claims priority, application Japan, May 17, 1985, 60-103945

Int. Cl.[4] H04H *5/00*

U.S. Cl. 381—10 **1 Claim**

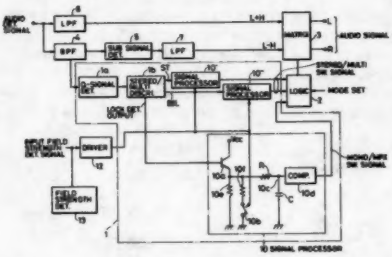
1. In a sound multiplex receiver having a sound multiplex discriminating circuit for identifying between a monaural and at least one type of multiplex broadcast from signals superposed on said broadcast and for producing at least one mode signal for controlling channel separating of said broadcasts, a mode signal processor comprising:

processing means for processing a mode signal of a broadcast and controlling separating of channels of said broadcast;

signal strength detecting means for detecting a ratio of signal to noise in said broadcast; and

control means for controlling said processing means in response to an output of said signal strength detecting means; wherein said detecting means detects a field strength of said broadcast;

wherein said processing means comprises integrator means for integrating said detection signal;



wherein said integrator means comprises a controllable resistance-capacitance time constant circuit which determines the integration period of said integrator; and

wherein said control means controls the time constant circuit to provide an integration period which is longer for a detection signal corresponding to a field strength decrease from a multiplex broadcast signal to a monaural broadcast signal than for a field strength increase from a monaural broadcast field strength to a multiplex broadcast field strength.

4,703,502

STEREO SIGNAL REPRODUCING SYSTEM

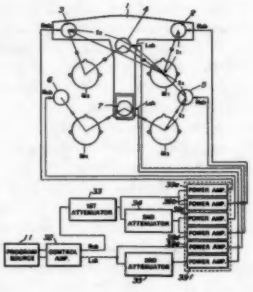
Junichi Kasai, Yokohama; Hiroshi Imai, Yokosuka, and Hiroshi Tsuda, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jan. 28, 1986, Ser. No. 823,250

Claims priority, application Japan, Jan. 28, 1985, 60-9029 [U]; Feb. 7, 1985, 60-22360; May 22, 1985, 60-77053[U]

Int. Cl.[4] H04R *5/00*

U.S. Cl. 381—24 **8 Claims**



1. A system for reproducing stereophonic signals to create a stereophonic sound image in front of each of first and second listeners sitting side by side in a compartment, comprising:

a right-hand loudspeaker positioned relative to the right of the first listener sitting on the right:

a left-hand loudspeaker positioned relative to the left of the second listener sitting on the left;

a center loudspeaker positioned between the right- and left-hand loudspeaker; and

a signal generator circuit for generating R and L stereophonic signals, one of the R and L signals being applied to drive the right-hand loudspeaker and also the left-hand loudspeaker, the other signal being applied to drive the center loudspeaker, the signal generator circuit including first control means for controlling the magnitude of the one signal to the right-hand loudspeaker and second control means for controlling the magnitude of the one signal to the left-hand loudspeaker, said first control means being operable in first and second directions respectively to increase and decrease the magnitude of the one signal to the right-hand loudspeaker, said first control means being further operable to decrease the magnitudes of the one signal to the left-hand loudspeaker and the other signal to the center loudspeaker when it is operated in the first direction and to increase the magnitudes of the one signal to the left-hand loudspeaker and the other signal to the central loudspeaker when it is operated in the second direction, said second control means being operable in first and second directions respectively to increase and decrease the magnitude of the one signal to the left-hand loudspeaker, said second control means being further operable to decrease the magnitudes of the one signal to the right-hand loudspeaker and the other signal to the center loudspeaker when it is operated in the first direction and to increase the magnitude of the one signal to the right-hand loudspeaker and the magnitude of the other signal to the central loudspeaker when it is operated in the second direction.

4,703,503

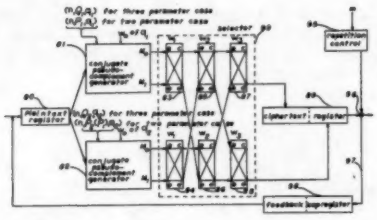
CRYPTOGRAPHIC SYSTEM USING PSEUDOCOMPLEMENTS OF VECTOR BOOLEAN ALGEBRA

Hitohisa Asai, 892 Catalina Dr., Newport News, Va. 23602

Filed Oct. 3, 1986, Ser. No. 915,234

Int. Cl.[4] H04L 9/04

U.S. Cl. 380—28 **18 Claims**



16. An apparatus for communicating securely over an insecure communication medium of the type which communicates a digital message A from a sender to a receiver by enciphering at said sender said digital message with two compound parameters $Q_1=P_i(P_k)$ and $Q_2=P_j(P_j)$, which are kept in secret or which are open to general public, constructed from three parameters, P_i, P_j and P_k, by transmitting said enciphered message from said sender to said receiver, by deciphering at the receiver's end said enciphered message using said parameter $P_i(=P_1)$ and a third compound parameter $Q_3=P_i(P_k)$, which are kept in secret, constructed from said three parameters where applicable pseudocomplementing operations that define the pseudocomplements of $Q_1=P_i(P_k)$, $Q_2=P_j(P_j)$ and $Q_3=P_i(P_k)$ as well as relationships $P_1(Q_1)=Q_2(Q_3)=Q_1(P_1)$ and $P_1=P_i$ are determined in first equation selected among the equations (6-1) through (6-16) which are

$P_1(Q_1)$	$Q_2(Q_3)$	$Q_1(P_1)$	
$P_i{}^{+}\text{-}(P_j{}^{*}\text{-}(P_k)\text{-})=$			(6-1)
	$(P_i{}^{*P}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{*}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{+}\text{-}(P_k)\text{-})^{*}\text{-}(P_j)$	

-continued

$P_1(Q_1)$	$Q_2(Q_3)$	$Q_1(P_1)$	
		$(P_j{}^{+}\text{-}(P_k)\text{-})^{*}\text{-}(P_j)$	
$P_i{}^{+}\text{-}(P_j{}^{*}\text{-}(P_k)\text{-})=$			(6-2)
	$(P_i{}^{*P}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{+}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{*}\text{-}(P_k)\text{-})^{*}\text{-}(P_j)$	
$P_i{}^{+}\text{-}(P_j{}^{+\prime}\text{-}(P_k)\text{-})=$			(6-3)
$(P_i{}^{+}\text{-}(P_j)\text{-}\&(P_i{}^{*P}\text{-}(P_k)\text{-})=(P_j{}^{+\prime}\text{-}(P_k)\text{-})^{*}\text{-}(P_j)$			
$P_i{}^{+}\text{-}(P_j{}^{**}\text{-}(P_k)\text{-})=$			(6-4)
	$(P_i{}^{+}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{+}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{**}\text{-}(P_k)\text{-})^{*}\text{-}(P_j)$	
$P_i{}^{++}\text{-}(P_j{}^{+}\text{-}(P_k)\text{-})=$			(6-5)
	$(P_i{}^{*\prime}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{*\prime}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{+}\text{-}(P_k)\text{-})^{++}\text{-}(P_j)$	
$P_i{}^{++}\text{-}(P_j{}^{*}\text{-}(P_k)\text{-})=$			(6-6)
	$(P_i{}^{*\prime}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{++}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{*}\text{-}(P_k)\text{-})^{++}\text{-}(P_j)$	
$P_i{}^{++}\text{-}(P_j{}^{+\prime}\text{-}(P_k)\text{-})=$			(6-7)
	$(P_i{}^{++}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{*\prime}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{+\prime}\text{-}(P_k)\text{-})^{++}\text{-}(P_j)$	
$P_i{}^{++}\text{-}(P_j{}^{**}\text{-}(P_k)\text{-})=$			(6-8)
	$(P_i{}^{++}\text{-}(P_j)\text{-})^{**}\text{-}(P_i{}^{++}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{**}\text{-}(P_k)\text{-})^{++}\text{-}(P_j)$	
$P_i{}^{*}\text{-}(P_j{}^{*P}\text{-}(P_k)\text{-})=$			(6-9)
$(P_k{}^{+}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{+}\text{-}(P_k)\text{-})=$			
		$(P_j{}^{*P}\text{-}(P_k)\text{-})^{+\prime}\text{-}(P_j)$	
$P_i{}^{*}\text{-}(P_j{}^{+}\text{-}(P_k)\text{-})=$			(6-10)
	$(P_i{}^{+}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{*}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{+}\text{-}(P_k)\text{-})^{+\prime}\text{-}(P_j)$	
$P_i{}^{*}\text{-}(P_j{}^{*\prime}\text{-}(P_k)\text{-})=$			(6-11)
	$(P_i{}^{*}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{+}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{*\prime}\text{-}(P_k)\text{-})^{+\prime}\text{-}(P_j)$	
$P_i{}^{*}\text{-}(P_j{}^{++}\text{-}(P_k)\text{-})=$			(6-12)
	$(P_i{}^{*}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{*}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{++}\text{-}(P_k)\text{-})^{+\prime}\text{-}(P_j)$	
$P_i{}^{**}\text{-}(P_j{}^{*P}\text{-}(P_k)\text{-})=$			(6-13)
	$(P_i{}^{+\prime}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{+\prime}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{*P}\text{-}(P_k)\text{-})^{**}\text{-}(P_j)$	
$P_i{}^{**}\text{-}(P_j{}^{+}\text{-}(P_k)\text{-})=$			(6-14)
	$(P_i{}^{+\prime}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{**}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{+}\text{-}(P_k)\text{-})^{**}\text{-}(P_j)$	
$P_i{}^{**}\text{-}(P_j{}^{*\prime}\text{-}(P_k)\text{-})=$			
(6-15)			
	$(P_i{}^{**}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{+\prime}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{*\prime}\text{-}(P_k)\text{-})^{**}\text{-}(P_j)$	
$P_i{}^{**}\text{-}(P_j{}^{++}\text{-}(P_k)\text{-})=$			(6-16)
	$(P_i{}^{**}\text{-}(P_j)\text{-})^{++}\text{-}(P_i{}^{**}\text{-}(P_k)\text{-})=$		
		$(P_j{}^{++}\text{-}(P_k)\text{-})^{**}\text{-}(P_j)$	

comprising:

s-plaintext register means for receiving and storing a digital message A,

first generator means for receiving and storing (i) said compound parameter Q_1 and (ii) $(u_1u_0)_1$, $(v_1v_0)_1$ and w_{01} of control bits q_1, for receiving the content of said s-plaintext register means, for enciphering said received digital message into a pair of conjugate pseudocomplements by performing conjugate pseudocomplementing operations with respect to said parameter Q_1, and for outputting said pair of the conjugate pseudocomplements from its terminals M_0 and M_1,

second generator means for receiving and storing (i) said compound parameter Q_2 and (ii) $(u_1u_0)_2$, $(v_1v_0)_2$ and w_{02} of control bits q_2, for receiving the content of said s-plain-

text register means, for enciphering said received digital message into a pair of conjugate pseudocomplements by performing conjugate pseudocomplementing operations with respect to said parameter Q_2, and for outputting said pair of the conjugate pseudocomplements from its terminals M_0 and M_1,

s-selector means for receiving (i) two pairs of conjugate pseudocomplements and (ii) switching bits w_3 and w_2, and control bit w_1, for selectively passing said received two pairs of conjugate pseudocomplements using said switching and control bits, and for outputting a selected pair of the pseudocomplements consisting of one pseudocomplement with respect to Q_1 and the other pseudocomplement with respect to Q_2,

s-ciphertext register means for receiving and transmitting an enciphered message,

first means, connect said s-plaintext register means to said first generator means and to said second generator means,

second means, connect said terminals M_0 and M_1 of each said generator means to said s-selector means, and for passing said selected pair of the pseudocomplements to said s-ciphertext register means through said s-selector means selected by said bits w_3, w_2 and w_1,

r-ciphertext register means for receiving and storing an enciphered message,

r-selector means for receiving (i) said switching bits w_3 and w_2, and control bit w_1, and (ii) an enciphered message, for selectively passing the conjugate pseudocomplements of said enciphered message received using said switching and control bits w_3, w_2 and w_1, and for outputting each of the conjugate pseudocomplements,

temporary register means for receiving and storing a pair of conjugate pseudocomplements with respect to $Q_2(Q_3)$ obtained from said enciphered message,

third generator means for receiving and storing said parameter P_i $(=P_1)$ and $(u_1u_0)_a$, $(v_1v_0)_a$ and $(w_0)_a$ of control bits q_a, for receiving and enciphering the pseudocomplement with respect to Q_1 of said enciphered message by taking pseudocomplementing operations with respect to P_i $(=P_1)$, which is specified by said bits $(u_1u_0)_a$, $(v_1v_0)_a$, and for outputting a produced pair of conjugate pseudocomplements with respect to $Q_1(P_1)=Q_2(Q_3)$,

fourth generator means for receiving and storing said compound parameter Q_3 and $(u_1u_0)_3$, $(v_1v_0)_3$ and $(w_0)_3$ of control bits q_3, for receiving and enciphering the pseudocomplement with respect to Q_2 of said enciphered message by taking pseudocomplementing operations with respect to Q_3, which is specified by said $(u_1u_0)_3$ and $(v_1v_0)_3$, and for outputting a produced pair of conjugate pseudocomplements with respect to $Q_2(Q_3)=Q_1(P_1)$,

r-plaintext register means for receiving and storing a deciphered message as the original plaintext,

switcher means for connecting two input terminals (a,b) to two output terminals (c,d) by alternatively switching said connection (a,b) to (c,d) and (a,b) to (d,c) respectively using control bit w_i where i denotes the suffix of said bits w_0, w_1, w_2 and w_3,

desegregator means for receiving and storing said compound parameter $Q_2(Q_3)=Q_1(P_1)$ and control bits $(u_1u_0)_b$, $(v_1v_0)_b$ and $(w_0)_b$ of q_b, for receiving and transforming said pair of conjugate pseudocomplements with respect to $Q_2(Q_3)$, which is the content of said temporary register means, to a targeted pair of the conjugate pseudocomplements $(A^{*\prime},A^{++})$ by performing the applicable complementing operations of $\{X',X^P,X_P,I\}$ specified by $(u_1u_0)_b$ and of $\{X^P,I,X',X_P\}$ specified by $(v_1v_0)_b$, and for executing a logical OR operation on said targeted pair, which has been transformed, in order to retrieve said digital message,

third means, connect said r-ciphertext register means to said third generator means through the first two switches of said r-selector means controlled by said bits w_3 and w_2 where said generator means generates said pair of conjugate pseudocomplements with respect to P_1,

fourth means, connect said third generator means to said desegregator means through (i) the third switch of said r-selector means controlled by said bit w_1 and (ii) said temporary register means where said desegregator means produces said targeted pair of conjugate pseudocomplements using said parameter $Q_2(Q_3)=Q_1(P_1)$ and said q_b,

fifth means, connect said fourth generator means to said desegregator means through (i) the third switch of said r-selector means controlled by said bit w_1 and (ii) said temporary register means where said desegregator means produced said targeted pair of conjugate pseudocomplements using said parameter $Q_2(Q_3)=Q_1(P_1)$ and said q_3,

sixth means for transferring the deciphered message produced by executing said logical OR operation into said ciphertext register means,

seventh means for obtaining (i) first pseudocomplement by performing said conjugate pseudocomplementing operations with respect to said compound parameter Q_1 in said first generator means and (ii) third pseudocomplement by performing said conjugate pseudocomplementing operations with respect to said parameter P_1 in said third generator means where said first pseudocomplement and said third pseudocomplement are defined in the first term or the second term of said second equation chosen from the equations (3-1) through (3-16), in order to acquire first objective term which is the third term or the fourth term of said chosen second equation,

eighth means for obtaining (i) second pseudocomplement by performing said conjugate pseudocomplementing operations with respect to said compound parameter Q_2 in said second generator means and (ii) fourth pseudocomplement by performing said conjugate pseudocomplementing operations with respect to said compound parameter Q_3 in said fourth generator means where said second pseudocomplement and said fourth pseudocomplement are defined in the first term or the second term of said third equation chosen from the equations (3-1) through (3-16), in order to acquire second objective term which is the third term or the fourth term of said chosen third equation,

ninth means for obtaining said conjugate pair of pseudocomplements with respect to said compound parameter $Q_2(Q_3)=Q_1(P_1)$ from said first objective term and said second objective term,

where said equations (3-1) through (3-16) are

$$(A^+{}_{P}\text{-}(P_\beta\text{-})^{+\prime}\text{-}(P_\beta)\text{-} = (A^{++}\text{-}(P_\beta\text{-})^+{}_{P}\text{-}(P_\beta)\text{-} = A^+{}_{P}\text{-}(P_i{}^{+}\text{+}\text{-}(P_\beta)\text{-}\ )\text{-} = A^*\text{-}(P_i{}^{+}{}_{P}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-1}$$

$$(A^+{}_{P}\text{-}(P_\beta\text{-})^{**}\text{-}(P_\beta)\text{-} = (A^{++}\text{-}(P_\beta\text{-})^{*}\text{-}(P_\beta\text{-} = A^+{}_{P}\text{-}(P_i{}^{*\prime}\text{-}(P_\beta)\text{-}\ )\text{-} = A^*\text{-}(P_i{}^{*}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-2}$$

$$(A^{*}\text{-}_{(\beta)}\text{-})^{+\prime}\text{-}(P_\beta)\text{-} = (A^{*\prime}\text{-}(P_\beta\text{-})^+{}_{P}\text{-}(P_\beta)\text{-} = A^+{}_{P}\text{-}(P_i{}^{+\prime}\text{-}(P_\beta)\text{-}\ )\text{-} = A^*\text{-}(P_i{}^{+\prime}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-3}$$

$$(A^{*}\text{-}(P_\beta\text{-})^{**}\text{-}(P_\beta)\text{-} = (A^{*\prime}\text{-}(P_\beta\text{-})^{*}\text{-}(P_\beta)\text{-} = A^+{}_{P}\text{-}(P_i{}^{*P}\text{-}(P_\beta)\text{-}\ )\text{-} = A^*\text{-}(P_i{}^{**}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-4}$$

$$(A^{+\prime}\text{-}(P_\beta\text{-})^{+\prime}\text{-}(P_\beta)\text{-} = (A^{+}\text{-}(P_\beta\text{-})^+{}_{P}\text{-}(P_\beta)\text{-} = A^{+\prime}\text{-}(P_i{}^{+}\text{+}\text{-}(P_\beta)\text{-} = A^{**}\text{-}(P_i{}^{+}{}_{P}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-5}$$

$$(A^{+\prime}\text{-}(P_\beta\text{-})^{*}\text{-}(P_\beta)\text{-} = (A^{+}\text{-}(P_\beta\text{-})^{*}\text{-}(P_\beta)\text{-} = A^{+\prime}\text{-}(P_i{}^{*\prime}\text{-}(P_\beta)\text{-}\ )\text{-} = A^{**}\text{-}(P_i{}^{*}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-6}$$

$$(A^{*\prime}\text{-}(P_\beta\text{-})^{+\prime}\text{-}(P_\beta)\text{-} = (A^{*P}\text{-}(P_\beta\text{-})^+{}_{P}\text{-}(P_\beta)\text{-} = A^{+\prime}\text{-}(P_i hu\text{+}\text{-}(P_\beta)\text{-}\ )\text{-} = A^{**}\text{-}(P_i{}^{+\prime}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-7}$$

$$(A^{**}\text{-}(P_\beta\text{-})^{**}\text{-}(P_\beta)\text{-} = (A^{*P}\text{-}(P_\beta\text{-})^{*}\text{-}(P_\beta)\text{-} = A^{+\prime}\text{-}(P_i{}^{*P}\text{-}(P_\beta)\text{-}\ )\text{-} = A^{**}\text{-}(P_i{}^{**}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-8}$$

$$(A^{*P}\text{-}(P_\beta\text{-})^{*\prime}\text{-}(P_\beta)\text{-} = (A^{**}\text{-}(P_\beta\text{-})^{*P}\text{-}(P_\beta)\text{-} = A^{+}\text{-}(P_i{}^{*P}\text{-}(P_\beta)\text{-}\ )\text{-} = A^{*P}\text{-}(P_i{}^{**}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-9}$$

$$(A^{*P}\text{-}(P_\beta\text{-})^{++}\text{-}(P_\beta)\text{-} = (A^{**}\text{-}(P_\beta\text{-})^{+}\text{-}(P_\beta)\text{-} = A^{+}\text{-}(P_i{}^{+}\text{-}(P_\beta)\text{-}\ )\text{-} = A^{*P}\text{-}(P_i{}^{+\prime}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-10}$$

$$(A^{+}\text{-}(P_\beta\text{-})^{*\prime}\text{-}(P_\beta)\text{-} = (A^{+\prime}\text{-}(P_\beta\text{-})^{*P}\text{-}(P_\beta)\text{-} = A^{+}\text{-}(P_i{}^{*P}\text{-}(P_\beta)\text{-}\ )\text{-} = A^{*P}\text{-}(P_i{}^{*}\text{-}(P_\beta)\text{-}\ )\text{-} \tag{3-11}$$

-continued

$$(A^{+}-(P_\partial)-)^{++}-(P_\partial)- = (A^{+\prime}-(P_\partial)-)^{+}-(P_\partial)- = \quad (3\text{-}12)$$
$$A^{+}-(P_i{}^{++}-(P_\partial)-)- = A^{*P}-(P_i{}^{+}{}_{P}-(P_\partial)-)-$$

$$(A^{*\prime}-(P_\partial)-)^{*\prime}-(P_\partial)- = (A^{*}-(P_\partial)-)^{*P}-(P_\partial)- = \quad (3\text{-}13)$$
$$A^{++}-(P_i{}^{*P}-(P_\partial)-)- = A^{*\prime}-(P_i{}^{**}-(P_\partial)-)-$$

$$(A^{*\prime}-(P_\partial)-)^{++}-(P_\partial)- = (A^{*}-(P_\partial)-)^{+}-(P_\partial)- = \quad (3\text{-}14)$$
$$A^{++}-(P_i{}^{+}-(P_\partial)-)- = A^{*\prime}-(P_i{}^{+\prime}-(P_\partial)-)-$$

$$(A^{++}-(P_\partial)-)^{*\prime}-(P_\partial)- = (A^{+}{}_{P}-(P_\partial)-)^{*P}-(P_\partial)- = \quad (3\text{-}15)$$
$$A^{++}-(P_i{}^{*\prime}-(P_\partial)-)- = A^{*\prime}-(P_i{}^{*}-(P_\partial)-)-$$

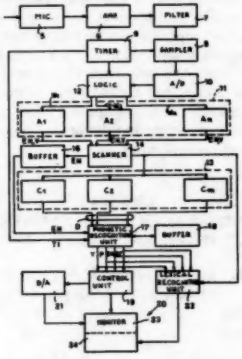
$$(A^{++}-(P_\partial)-)^{++}-(P_\partial)- = (A^{+}{}_{P}-(P_\partial)-)^{+}-(P_\partial)- = \quad (3\text{-}16)$$
$$A^{++}-(P_i{}^{++}-(P_\partial)-)- = A^{*\prime}-(P_i{}^{+}{}_{P}-(P_\partial)-)-.$$

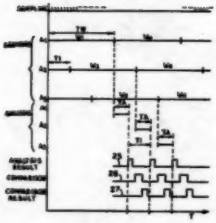
4,703,504

METHOD AND APPARATUS FOR THE PHONETIC RECOGNITION OF WORDS

Vittore Vittorelli, Ivrea, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Nov. 8, 1983, Ser. No. 549,656
Claims priority, application Italy, Nov. 8, 1982, 68302 A/82
Int. Cl.⁴ G10L *1/00*
U.S. Cl. 381—51 **6 Claims**





1. A method for the phonetic recognition of words spoken by a speaker comprising the folowing steps: periodically analysing a speech portion to obtain at least one speech vector,

comparing said vector with a plurality of reference vectors each one representing a corresponding reference phoneme,

selecting the reference phoneme represented by the reference vector of said plurality most similar to said speech vector,

generating a merit code corresponding to the degree of similarity of the speech vector with the reference vector representing the selected reference phoneme,

generating a phoneme code indicative of the selected reference phoneme,

generating a stability signal in response to the selection of the same reference phoneme in at least two successive analyses, and

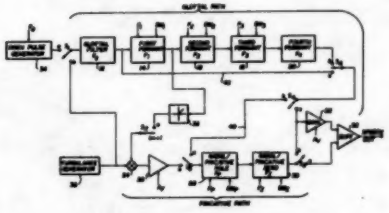
displaying in real time on a monitor screen visible indications of said stability signal, of said phoneme code and of said merit code, whereby said indications continuously monitor the correspondence between the speaker's pronunciation and the pronunciation corresponding to reference phonemes.

4,703,505

SPEECH DATA ENCODING SCHEME

Norman C. Seiler, West Melbourne, Fla., and Stephen S. Walker, Lilburn, Ga., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 24, 1983, Ser. No. 526,065
Int. Cl.⁴ G10L *5/00*
U.S. Cl. 381—51 **13 Claims**



1. In a formant based speech synthesizer, including at least three formant filters, a pitch and turbulence generator, spectral filter, nasal zero and pole filters, glottal and fricative attenuators, and control means for controlling the configuration and parameters of the above elements, the improvement being said control means which comprises:

storing means for storing command signals each of which includes a first portion indicating the type of command signal and a second portion indicating values of a first set of synthesizer parameters;

said first portion of said command signals indicating initialization of sound classes, repeating the previous command signal, updating previous command signals and end of word types of command signals;

determining means connected to said storing means and responsive to said first portion of said command signal for determining the configuration of said synthesizer to produce a class of sound; and

producing means connected to said storing means and responsive to said second portion of said command signals for producing values for a second set of synthesizer parameters as a function of said values of said first set of synthesizer parameters;

adjusting means connected to said storing means and said producing means for adjusting the operating characteristics of said synthesizer as a function of said first and second set of synthesizer parameters.

4,703,506

DIRECTIONAL MICROPHONE APPARATUS

Atsushi Sakamoto, and Makoto Iwahara, both of Sagamihara, Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Jul. 22, 1986, Ser. No. 888,057
Claims priority, application Japan, Jul. 23, 1985, 60-162572
Int. Cl.⁴ H04R *3/00*
U.S. Cl. 381—92 **10 Claims**

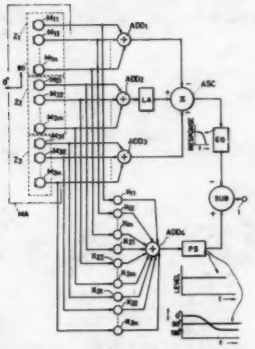
1. A directional microphone apparatus comprising:

a plurality of microphone units arranged in a specific config-

uration to form a microphone unit array, said microphone unit array being divided into at least three sets of microphone units, with each of said microphone units having sensitivity in a direction perpendicular to the direction of a main lobe of said microphone apparatus and with each of said sets of microphone units comprising at least one of said microphone units;

a plurality of first addition circuit means each coupled to receive output signals from each of said microphone units of a corresponding one of said sets of microphone units, to produce a corresponding sum signal for each of said microphone unit sets;

signal processing means for processing said sum signals from each of said addition circuits, for thereby producing a first signal which conforms to a second order bidirectional sound pressure gradient characteristic;



a plurality of weighting circuits coupled to receive said output signals from respective ones of said microphone units, for producing corresponding weighted signals in accordance with predetermined weighting coefficients;

second addition circuit means for summing said weighted signals to produce a second signal;

equalizer circuit means coupled to receive a specific one of said first and second signals, for producing an equalized signal having signal components within a predetermined range of low frequencies in the audio frequency range which are substantially identical to corresponding signal components in the other one of said first and second signals under a condition in which identical sound waves are simultaneously applied to all of said microphone units; and

combining circuit means for combining said equalized signal with said other one of said first and second signals to produce an output signal from said directional microphone apparatus.

4,703,507

NOISE REDUCTION SYSTEM

Thomas W. Holden, 507 South Washington St., Beverly Hills, Fla. 32665

Continuation-in-part of Ser. No. 596,891, Apr. 5, 1984, abandoned. This application Jul. 25, 1986, Ser. No. 890,617

Int. Cl.[4] H04B *1/10, 15/00*

U.S. Cl. 381—94 **12 Claims**

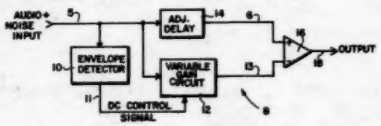
1. A noise reduction system for connection to the output of a radio receiver or the like comprising:

a signal input for receiving an intelligence plus noise signal or a noise only signal;

a differential output circuit having a first input connected to said signal input;

an envelope detector connected to said signal input for producing a slowly varying do control signal proportional to the envelope of the intelligence and noise signals at said signal input; and

a variable gain circuit including a bridge circuit having a pair of input terminals connected to said signal input and a pair of output terminals, said bridge having a controllable resistance in one leg thereof, said controllable resistance operatively connected to said envelope detector for receiving said do control signal whereby said controllable resistance is varied to vary the balance of said bridge circuit, and a differential amplifier having a pair of differential input terminals connected to said bridge output terminals and an output terminal connected to a second



input of said differential output circuit, said differential amplifier having a high output when said bridge is greatly unbalanced and a low output when said bridge approaches balance, said do control signal applied to said variable gain circuit for controlling the gain thereof, said variable gain circuit controlled to produce an output signal at said second input of said differential output circuit essentially equal in amplitude and phase to a signal at said first input thereof when a noise only signal is present at said signal input and to produce an output signal at said second input of said circuit differing in amplitude from a signal at said first input thereof when an intelligence plus noise signal is present at said signal input.

4,703,508

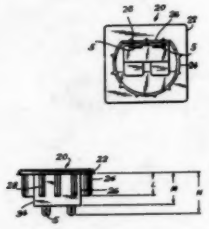
LOUDSPEAKER TERMINAL STRIP

Mitsuo Umezu, Fort Lee, N.J., assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 23, 1986, Ser. No. 854,929

Int. Cl.[4] H04R *1/02, 1/06;* **H01R** *13/72*

U.S. Cl. 381—188 **15 Claims**



1. A loudspeaker terminal strip for mounting in a hole in a cabinet wall for facilitating an electrical connection between at least two electrical conductors, comprising:

terminal element means having a first and second electrical connection means for use in making an electrical connection between two electrical conductors;

a housing for mounting said terminal element means, said housing including:

a flat flange element for abutting said cabinet wall;

a hollow cup-shaped portion extending a predetermined length from said flange element and having said terminal element means arranged therein with said first and second electrical connection means respectively arranged inside and outside an end wall of said hollow cup-shaped portion, said cup-shaped portion being adapted for insertion into said hole,

and said housing further including a flat extension element that extends beyond said predetermined length of said cup-shaped portion and being adapted for initial insertion into and engagement with said hole, whereby said extension element initially engages a side wall of said hole ahead of said cup-shaped portion during said mounting in said cabinet wall and extends into said hole in the cabinet wall with said end wall of said hollow cup-board portion following said mounting.

4,703,509

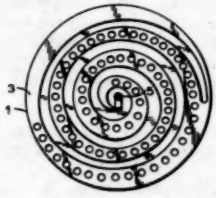
ELECTROSTATIC ACOUSTIC CONVERTER WITH STATIONARY ELECTRODE HAVING A PROGRESSIVELY INCREASING SURFACE RESISTANCE

Peter K. Kanchev, Sofia, Bulgaria, assignor to Zavod za Elektronni Preobrazuvatelni Elementi, Sofia, Bulgaria

Continuation-in-part of Ser. No. 460,635, Jan. 24, 1983, abandoned. This application Jun. 19, 1985, Ser. No. 746,356

Int. Cl.[4] H04R *19/02*

U.S. Cl. 381—191 **2 Claims**



1. An electrostatic acoustic converter-loudspeaker having two parallel stationary electrodes each having a signal terminal for connection to a source of sound frequency signals and between the stationary electrodes there is fixed a flexible plastic partially conductive diaphragm isolated from the stationary electrodes and having a terminal for connection to a source of polarizing voltage, characterized in that the stationary electrodes comprise a single electrically continuous resistive layer coated over an insulating perforated plate, said resistive layer having a surface resistance without the aid of external resistors which surface resistance progressively increases from 10^0 to 10^6 ohms.

4,703,510

ELECTRO-ACOUSTIC TRANSDUCER WITH DIAPHRAGM AND BLANK THEREFOR

David A. Larson, 2460 Wisconsin Ave., Downers Grove, Ill. 60515

Continuation-in-part of Ser. No. 503,947, Oct. 13, 1983, Pat. No. 4,536,623, which is a division of Ser. No. 389,423, Jun. 17, 1982, Pat. No. 4,491,698. This application Dec. 20, 1984, Ser. No. 684,389

Int. Cl.[4] H04R *7/02, 9/04*

U.S. Cl. 381—196 **18 Claims**

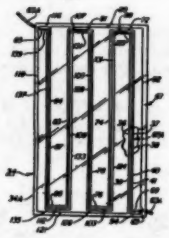
1. In an electro-acoustic transducer having magnetic means forming a plurality of spaced-apart longitudinal magnetic gaps, a diaphragm comprising:

a sheet of film having at least one surface with a pattern of conductive strips formed thereon in a Greek pattern of alternating longitudinal and transversing groups of conductors as a conductive coil having an odd number of individual conductors in each of said groups,

there being an odd number of said longitudinal groups extending in generally parallel spaced-apart relation from a first end of the sheet to a second end of the sheet, and an even number of said transverse groups extending between said longitudinal groups at said first and second ends to form said Greek pattern;

said sheet being folded to make a plurality of spaced-apart generally U-shaped channels forming elongated projections extending perpendicularly from a back of the sheet opposite the surface upon which the pattern is formed, each fold being made at a center one of the odd number of individual conductors of a group;

said pattern of conductive strips including return conductors



extending around the outside perimeter of said pattern of conductive strips for extending each individual conductor in said group to a start of said pattern of conductive strips, there being an odd number of said return conductors on each side of said pattern of conductive strips, and diagonally opposite terminal ends of the conductive coil thus formed, to maintain a balanced weight distribution.

4,703,511

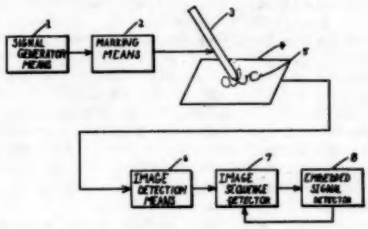
WRITING INPUT AND DYNAMICS REGENERATION DEVICE

Paul Conoval, 2260 Cedar Cove Ct., Reston, Va. 22091

Filed Oct. 9, 1986, Ser. No. 917,214

Int. Cl.[4] G06K *9/00;* **G01D** *15/10*

U.S. Cl. 382—13 **17 Claims**



1. A writing dynamics input device comprising:

marking means for producing marking transfers on a surface;

writing stylus means comprising said marking means adapted for positioning said marking transfers on said surface in a writing path traversed in accordance with writing thereby producing a sequence of said marking transfers on said surface arranged in a configuration corresponding to said writing path, wherein said marking transfer sequence comprises first information manifested in the spatial configuration thereof;

time code means for generating a time code sequence having output values comprising second information related to advancing time;

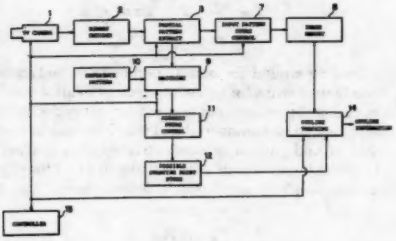
modulation means for modifying a characteristic of said marking transfers in accordance with said time code sequence and simultaneously to the generation of said writing, thereby producing a sequence of modified marking transfers on said surface arranged in said writing path, said modified marking transfer sequence characterized by said first information manifested in said spatial configuration thereof and said second information manifested in said characteristic modifications of said marking transfers

therewithin, whereby a time relationship between said marking transfers and said second information is produced, said time relationship relating to the dynamics of said writing.

4,703,512
PATTERN OUTLINE TRACKING METHOD AND APPARATUS

Kazuhiko Saka, Joyo; Atsushi Hisano, Nagaokakyo; Michitaka Kato, Kyoto; Toshimichi Masaki, Takatsuki, and Nobuo Nakatsuka, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jul. 30, 1985, Ser. No. 760,607
Claims priority, application Japan, Jul. 31, 1984, 59-162264
Int. Cl.[4] G06K *9/30, 9/46*
U.S. Cl. 382—22 **6 Claims**



1. A pattern outline tracking apparatus comprising:

a pickup device for scanning an object to be recognized and providing a series of analog video signals;

a binary signal encoder for comparing a level of said analog video signal with a threshold level and providing a binary signal consisting of a sequence of serial bits;

image memory means for holding the binary signal bits as an input image pattern;

partial pattern extracting means interposed between said binary signal encoder and said image memory means for deriving partial patterns sequentially from the binary signal while the binary signal is transferred from said binary encoder to said image memory means, each of said partial patterns consisting of a matrix of vertical and horizontal lines each containing specific numbers of pixels;

comparator means for matching the partial patterns against corresponding reference patterns containing previously defined starting points to be tracked;

storage means for holding an address in said image memory for a certain pixel within a partial pattern identified by said comparator means as a possible point address for the tracking operation; and

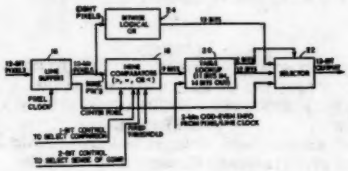
means for tracking an outline of said input image pattern on said image memory in accordance with said possible point address.

4,703,513
NEIGHBORHOOD COMPARISON OPERATOR

Donald B. Gennery, Glendale, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 31, 1985, Ser. No. 815,099
Int. Cl.[4] G06K *9/46*
U.S. Cl. 382—27 **9 Claims**

1. In a neighborhood comparison operator for comparing the digital value of a center pixel of a 3×3 moving window with a threshold value and the values of eight neighbor pixels with the threshold value or the value of the center pixel, said operator having means for storing nine pixel values of a moving 3×3 window of a stream of pixel values in digital form, and having nine comparators, one for each pixel value of the 3×3 window, each adapted to receive said threshold value for comparison, and in the case of the eight neighborhood pixel comparators further adapted to receive the value of said center pixel, and means for selecting for comparison in said eight neighborhood pixel comparators either said threshold for the central pixel value, control means for selecting the sense of comparison from the choice of either greater than, equal to, or

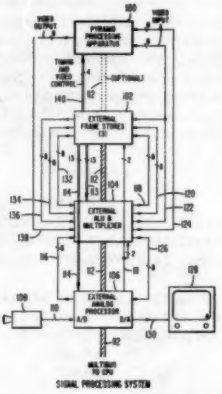


less than, an improvement comprising means for appending two bits to the output of said comparators, one bit indicating whether the center pixel is odd or even when counted in sequence for each scan line, and the other indicating whether the scan line is odd or even for each frame, and a memory containing preprogrammed information in a table addressed by the result of comparison and said two appended bits.

4,703,514
PROGRAMMED IMPLEMENTATION OF REAL-TIME MULTIRESOLUTION SIGNAL PROCESSING APPARATUS

Gooitzen S. van der Wal, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 16, 1985, Ser. No. 776,474
Int. Cl.[4] G06K *9/36*
U.S. Cl. 382—41 **12 Claims**



1. In a delayed real time multiresolution processing apparatus utilizing digital techniques for operating during each of successive time cycles at respective levels of resolution which respective levels of resolution differ from each other, on a series of termporal signal samples that define at least one block of an n-dimensional information component, where n is a given integer of at least one, each of said time cycles being composed of a certain number of sample periods that is at least as large as the number of temporal signal samples in said series; the combination comprising:

a programmable filter logic unit for deriving during each successive time cycle a set of one or more sampled-signal outputs therefrom as specified selectable functions of a set

of one or more sampled-signal inputs thereto in accordance with the values of applied first digital control signals, whereby said programmable filter logic unit sequentially performs processing at each of said respective levels of resolution;

a plurality of addressable read/write memory means each of which is separately addressable in each of said n dimensions, each of said memory means being controllable in accordance with the values of applied second digital control signals;

programmable coupling means including a first set of multiplexers (MUX) individually associated with each of said filter logic unit outputs and a second set of MUX individually associated with each of filter logic unit inputs for selectively coupling:

(1) any filter logic unit output as a write-input to a selected one of at least two of said memory means through that one of said first set of MUX individually associated with that filter logic unit output,

(2) the read-output of any one of said at least two of said memory means to a selected one of said filter logic unit inputs through that one of said second set of MUX individually associated with that filter logic unit input,

(3) any filter logic unit output directly to any selected one of said filter logic unit inputs through those respective ones of said first and second sets of MUX that are individually associate with that filter logic unit output an that selecte one of said filter logic unit inputs, and

(4) an applied external series of said temporal signal samples to any selected one of said filter logic unit inputs through that one of said second set of MUX individually associated with that selected one of said filter logic unit inputs,

all in accordance with the values of applied third digital control signals; and

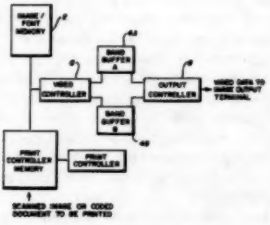
timing and control means for deriving and applying said respective first, second and third digital control signals which together determine the level of resolution of processing done by said programmable filter logic unit during each said successive time cycle, said timing and control means including addressable instruction memory means for determining the respective values of said first, second and third digital control signals during each one of said certain number of sample periods in each of said time cycles.

4,703,515

IMAGE ROTATION

Anthony J. Baroody, Jr., Pittford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 26, 1985, Ser. No. 769,525
Int. Cl.[4] G06K 9/32
U.S. Cl. 382—46 **4 Claims**



1. A method of selectively rotating a digital image in a system having a memory for storing a digital image, a band buffer for storing a band of the digital image representing a given number of scan lines, a video controller for moving a band of the digital image from the memory to the band buffer, and an output controller for moving a band of the digital image from the band buffer to a raster output scanning device, including the steps of:

storing the digital image in the memory, said digital image stored divided into bands having a first image format having a first scan direction;

moving said digital image bands with said video controller from the memory to the band buffer for selective storage in either of first and second image formats, said second image format having a second scan direction, whereby the digital image band is partially rotated as it is stored in said band buffer; and

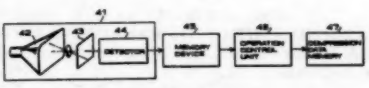
moving said digital image portions stored in said band buffer in one of said first and second image formats, with said output controller from said band buffer to said raster output scanning device, and selectively rotating said image portions in said first and second image formats during movement to said raster output scanning device, whereby selective image rotation is completed.

4,703,516

CHARACTER IMAGE DATA COMPRESSION SYSTEM

Shinichiro Fukuda, Tokyo, Japan, assignor to Shaken Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 372,151, Apr. 27, 1982, abandoned.
This application Jun. 25, 1985, Ser. No. 748,147
Claims priority, application Japan, Dec. 28, 1981, 56-211909
Int. Cl.[4] G06K 9/36
U.S. Cl. 382—56 **9 Claims**



1. A character image data compression method for compressing matrix-type binary data having data elements formed in lines and in combination corresponding to a two-directional character image comprising the steps of:

detecting the occurrence or non-occurrence of a character image segment in each data element of the matrix in each line;

identifying a contact state in a vertical direction of said character image segment, by comparison of data in adjacent lines; and

producing an output comprising a control code corresponding to said contact state, and variable length coded data corresponding to information of respectively different types in accordance with the type of contact state, said control code being applicable to all of said states,

wherein the contact state in a vertical direction of said character image segment, is identified as any one of the following modes: an insertion mode (INS) in which no contact segment exists in a previous line, a simple contact different mode (DIF) in which one segment in the previous line contacts to one segment in a present line, a join mode (JOIN) in which a plurality of segments in the previous line contact to one segment in the present line, a fork mode (FORK) in which one segment in the previous line contacts to a plurality of segments in the present line, a join-fork mode (J-F) in which a plurality of segments in the previous line contact to a plurality of segments in the present line, and a deletion mode (DEL) in which no contact segment exists in the present line, and the encoded information includes a control code corresponding to the contact state, and also

(a) information regarding a length (M) of a background portion prior to said segment and a length (N) of said segment in a case where said contact state corresponds to the insertion mode (INS),

(b) information regarding difference amounts (S;D) at each end of respective contact segments and/or repeat

number (K) of said simple contact difference mode of the succeeding lines, and/or polarity information (Ps;Pd) applying positive and negative polarities to said difference amounts (S;D) in a case where said contact state corresponds to the simple contact difference mode (DIF),

(c) information regarding a number (Q) of segments to be joined and difference amounts (S;D) between extreme ends of a plurality of segments to be joined and ends of one joined segment, and polarity information (Ps;Pd) regarding said difference amounts (S;D) in a case where said contact state corresponds to the join mode (JOIN),

(d) information regarding a number (Q) of forked segments and run-lengths (Mq;Nq) of formed segments in a case where said contact state corresponds to the fork mode (FORK), or

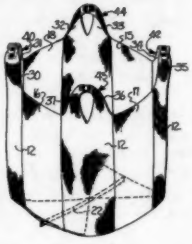
(e) information regarding a number (Qj) of segments to be joined, the number (Qf) of the forked segments, and run-lengths (Mqf;Nqf) of said forked segments in a case where said contact state corresponds to join-fork mode (J-F), but when the contact state corresponds to the deletion mode, only a deletion mode control code (DEL) is produced.

4,703,517

CARGO BAG WITH INTEGRAL LIFTING LOOPS

Frank J. Marino, Hialeah, Fla., assignor to Marino Technologies, Inc., Hialeah, Fla.

Filed May 22, 1986, Ser. No. 865,688
Int. Cl.[4] B65D *33/14, 88/16*
U.S. Cl. 383—7 **8 Claims**



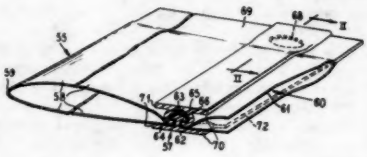
1. A cargo bag of flexible material for transportation and storage of bulk material and including four upstanding and interconnected side walls defining four corners of said cargo bag, a closed bottom, and an upper filling opening, said cargo bag being characterized by four pairs of lifting panels, each of said lifting panels including upper and lower end portions and opposed side edges, said lower end portions of each of said lifting panels being formed integrally with and extending upwardly from the upper edge of said side walls, each of said four pairs of lifting panels being positioned on and extending upwardly from a corresponding corner of said cargo bag, adjacent edges of the lower portions of each of said four pairs of lifting panels being positioned immediately adjacent each other at a corresponding corner of the upper edge of said side walls, said upper end portions of adjacent lifting panels being positioned in overlapping relationship, and means interconnecting said overlapping upper end portions of said adjacent lifting panels and forming a lifting loop above each corner of said cargo bag for supporting and moving said cargo bag from one location to another.

4,703,518

ATTACHMENT OF PLASTIC ZIPPER TO THE OUTSIDE OF INCOMPATIBLE BAG WALL WEB

Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 769,894, Aug. 27, 1985. This application Aug. 11, 1986, Ser. No. 895,309
Int. Cl.[4] B65D *33/24*
U.S. Cl. 383—63 **9 Claims**



1. In a bag comprising a thin web material body having opposite walls providing a bottom end, side seal seams and an openable top flanked by opposed upwardly projecting pull flanges:

extruded plastic zipper means comprising a pair of strips having complementary reclosably interlockable zipper profiles having the profiles facing toward one another and the strips located in alignment along lower sides of said pull flanges;

one of said strips being mounted on the outside of one wall of the bag body and the other of said zipper strips being mounted along the outside of the opposite wall of the bag body;

said material of said bag body and the material of said zipper strips being fusibly incompatible;

said side seams having holes therethrough; and

fused anchors securing the ends of said zipper strips together through said holes so that the strips are attached to said bag body without affecting the integrity of the bag walls or said side seal seams, so that said zipper strip profiles interlockably interengage and pinch the area of the bag walls between the strips into the interlocked profiles and thereby hold the bag top closed.

6. A method of making a bag equipped with extruded plastic reclosable zipper means, comprising:

forming a bag body from thin web material and having a bottom end, closed sides and an openable top flanked by opposed upwardly projecting pull flanges;

providing said bag sides with side seams;

providing extruded plastic zipper strips and comprising a pair of opposed strips located in alignment on opposite outside faces of said bag body with complementary reclosably interlockable zipper profiles of the strips facing toward one another with an area of the bag body material intervening between said strips so that the strips can be squeezed together with the intervening material locked in the profiles;

assembling said profile strips with the bag body and with opposite ends of the strips sandwiching sides of the bag therebetween;

forming holes in said side seams aligned with said strip ends; and

fusing connecting anchors from the end portions of the strips through said holes for thereby attaching said opposite ends of said strips to said bag sides.

4,703,519

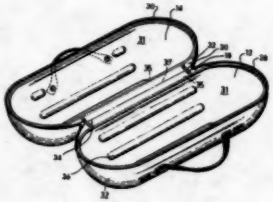
SEWN POLYOLEFIN AND FABRIC BAG AND METHOD OF MAKING BAG

Ronald L. Krenzel, 940 Poplar, Boulder, Colo. 80302

Filed Jan. 6, 1986, Ser. No. 816,554

Int. Cl.[4] A45C *5/02, 11/38;* **B21D** *51/52;* **B29C** *45/00*

U.S. Cl. 383—97 **24 Claims**



1. A hand held bag capable of substantially maintaining a predetermined shape while transporting specified items and deformable to provide a soft exterior surface comprising:

polyolefin enclosure means thermoformed to produce said predetermined shape, said polyolefin enclosure means having at least two individual portions and a thickness and density sufficient to maintain said predetermined shape and allow said polyolefin enclosure means to be sewn with thread;

fabric hinge means including a fabric strip having opposing edge portions extending along a longitudinal axis, each of said individual portions of said polyolefin enclosure means having interior and exterior surfaces, said fabric strip being positioned with said opposing edge portions respectively adjacent the interior surfaces of said individual portions and respectively sewn with said thread to the individual portions of said polyolefin enclosure means to couple said individual portions and to allow relative movement between said individual portions between opened and closed positions; and,

closure means having fabric portions sewn to said polyolefin enclosure means for selectively joining said individual portions of said polyolefin enclosure means in said closed position with the exterior surfaces of said individual portions facing outwardly of said polyolefin enclosure means and the interior surfaces thereof facing inwardly and with the opposing edge portions of said fabric strip respectively adjacent the interior surfaces of said individual portions and facing inwardly of said polyolefin enclosure means.

17. A method of forming a hand-held bag capable of substantially maintaining a predetermined shape and providing shock protection for items carried in said bag comprising the steps of:

thermoforming polyolefin material into at least two individual enclosure portions having predetermined shapes, each of said enclosure portions having interior and exterior surfaces,

providing fabric hinge means including a fabric strip having opposing edge portions extending along a longitudinal axis, positioning said fabric strip with said opposing edge portions respectively adjacent the interior surfaces of said enclosure portions, and respectively sewing said opposing edge portions of said fabric strip to said enclosure portions to couple said enclosure portions and to allow relative movement between said enclosure portions between opened and closed positions; and,

sewing fabric closure means to said enclosure portions of said polyolefin material to allow said enclosure portions to be selectively joined in said closed position with the exterior surfaces of said enclosure portions facing outwardly of said polyolefin enclosure means and the interior surfaces thereof facing inwardly and with the opposing edge portions of said fabric strip respectively adjacent the interior surfaces of said enclosure portions and facing inwardly of said polyolefin enclosure means.

4,703,520

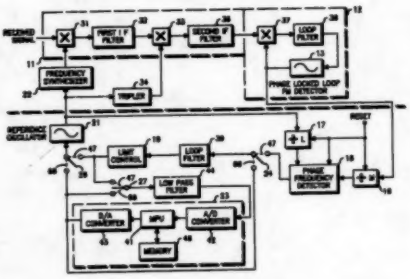
RADIO TRANSCEIVER HAVING AN ADAPTIVE REFERENCE OSCILLATOR

Walter J. Rozanski, Jr., Hurst, and Kevin M. Laird, Haltom City, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 31, 1986, Ser. No. 925,768

Int. Cl.[4] H04B *1/40*

U.S. Cl. 455—75 **17 Claims**



7. A radio transceiver having:

reception means for receiving an RF signal of interest;

transmission means for transmitting an RF signal of interest;

detector means operably connected to respond to said reception means, for detecting information modulated on said received RF signal of interest, if any, said detector means including a voltage controlled oscillator that provides an output signal;

adaptive reference oscillator means for providing a reference signal output for use by both said reception means and said transmission means, said adaptive reference oscillator means including:

phase frequency detector means for receiving and comparing said output signal and said reference signal output, and for providing a control signal;

reference oscillator means for responding to said control signal by providing said reference signal output;

memory means for selectively receiving said control signal, for storing at least one reliable value of said control signal, and for providing a reliable value of said control signal to said reference oscillator means to control said reference signal output when said radio transceiver transmits said RF signal of interest.

DESIGN PATENTS

GRANTED OCT. 27, 1987

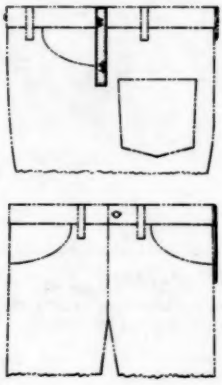
ERRATA

For CLASS	See PATENT NO.
D26-085	292,525

DESIGNS

OCTOBER 27, 1987

292,440
HAND LOOP FOR JEANS
Dennis Landreth, Rte. 7, Box 225, Harrison, Ark. 72601
Filed Jul. 13, 1984, Ser. No. 630,860
Term of patent 14 years
U.S. Cl. D2—25



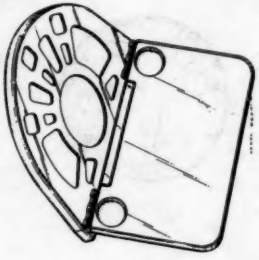
292,441
SANDAL WITH STRAP POCKET
Robert J. Gamm, St. Louis County, Mo., assignor to Kangaroos U.S.A., Inc., Chesterfield, Mo.
Filed Aug. 20, 1985, Ser. No. 767,786
Term of patent 14 years
U.S. Cl. D2—265

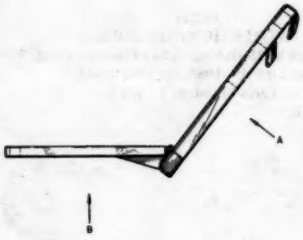
292,442
SHOE DECORATION
Ben R. Wadsworth, 6813 St. Anne, Dallas, Tex. 75248
Filed Jul. 19, 1985, Ser. No. 756,793
Term of patent 14 years
U.S. Cl. D2—315

292,443
ATHLETIC SHOE SOLE
Frederick Ihlenburg, 25 Davinci, Lake Oswego, Oreg. 97034
Filed Oct. 19, 1984, Ser. No. 663,675
Term of patent 14 years
U.S. Cl. D2—320

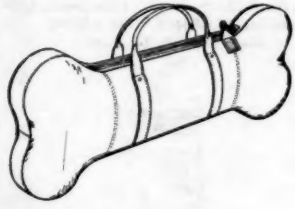
292,444
LEGGING
Bradford H. Pankopf, 267 Nieto Ave., Long Beach, Calif. 90803
Filed Jul. 20, 1984, Ser. No. 632,993
Term of patent 14 years
U.S. Cl. D2—330

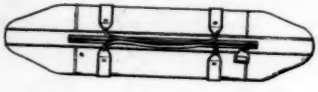
292,445
VEHICLE STEERING WHEEL TRAY
Andrew Judge, 127, Temple Lane, Copmanthorpe, York. YO2 3TE, England
Filed Feb. 12, 1985, Ser. No. 700,639
Claims priority, application United Kingdom, Aug. 14, 1984, 84-1021465
Term of patent 14 years
U.S. Cl. D3—40





292,446
LUGGAGE CASE
N. Carol Gilbert, Atlanta, Ga., assignor to Fireplugs, Inc., Gainesville, Ga.
Filed Mar. 6, 1985, Ser. No. 708,647
Term of patent 14 years
U.S. Cl. D3—44

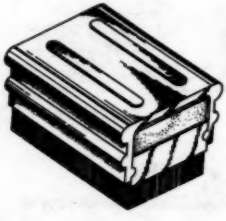




292,447
DISPOSABLE TOOTHBRUSH
Richard Macias, 1780 Parkdale Way, San Jose, Calif. 95127
Filed Jul. 30, 1985, Ser. No. 760,530
Term of patent 14 years
U.S. Cl. D4—104

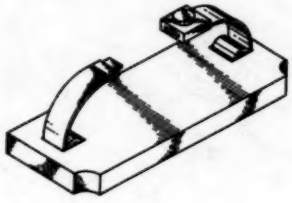
292,448
TOOTHBRUSH
Gianni Vianello, Paris, France, assignor to Lever Brothers Company, New York, N.Y.
Filed Mar. 25, 1986, Ser. No. 845,759
Claims priority, application France, Sep. 26, 1985, 85 4500
Term of patent 14 years
U.S. Cl. D4—104

292,449
COMBINED BRUSH AND SPONGE
Mike Anderson, Rte. 4, Box 125, Monticello, Ind. 47960
Filed Feb. 25, 1985, Ser. No. 705,382
Term of patent 14 years
U.S. Cl. D4—116



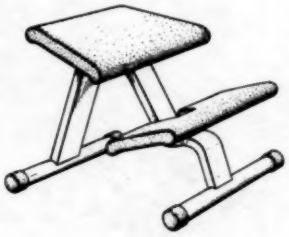
292,450
COMBINED PAINT ROLLER AND SPATTER SHIELD
Howard R. Moon, Fort Atkinson, Wis., assignor to EZ Paintr Corporation, Milwaukee, Wis.
Filed May 31, 1985, Ser. No. 739,947
Term of patent 14 years
U.S. Cl. D4—122

292,451
CHILD'S SAFETY SEAT FOR USE PRIMARILY IN A SHOPPING CART
Susan D. Jorgensen, 7912 141 Ave. E., Puyallup, Wash. 98372
Filed May 29, 1985, Ser. No. 739,085
Term of patent 14 years
U.S. Cl. D6—333



292,452
CHAIR
Oddvin Rykken, Bygdøy Allé 12, N-0262 Oslo 2, Norway
Filed Apr. 25, 1985, Ser. No. 727,255
Claims priority, application Norway, Nov. 6, 1984, 65695
Term of patent 14 years
U.S. Cl. D6—335

292,453
CHAIR
Peter Opsvik, Högtunveien 12, N-1370 Asker, Norway
Filed Apr. 25, 1985, Ser. No. 727,090
Claims priority, application Norway, Nov. 6, 1984, 65691
Term of patent 14 years
U.S. Cl. D6—335



292,454
CHAIR
Oddvin Rykken, Bygdøy Allé 12, N-0262 Oslo 2, Norway
Filed Apr. 25, 1985, Ser. No. 727,254
Claims priority, application Norway, Nov. 6, 1984, 65694
Term of patent 14 years
U.S. Cl. D6—335

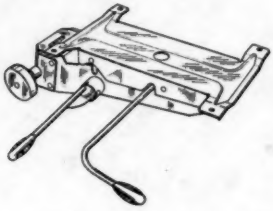
292,455
CHAIR
Oddvin Rykken, Bygdöy Allé 12, N-0262 Oslo 2, Norway
Filed Apr. 25, 1985, Ser. No. 727,010
Claims priority, application Norway, Nov. 6, 1984, 65693
Term of patent 14 years
U.S. Cl. D6—335

292,456
COMBINED CANOPY BED AND FAN UNIT
Kenneth L. Wycoff, 3818 Pitkin Ave., Flint, Mich. 48506
Filed May 22, 1985, Ser. No. 736,956
Term of patent 14 years
U.S. Cl. D6—389

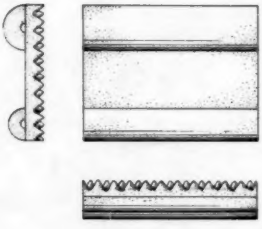
292,457
COLLAPSIBLE GUN RACK
David E. Hunter, 316 Campus, Ferris, Tex. 75125
Filed Feb. 15, 1985, Ser. No. 702,399
Term of patent 14 years
U.S. Cl. D6—469

292,458
CONSOLE OR THE LIKE
William Doezema, Grand Rapids, Mich., assignor to Baker, Knapp & Tubbs, Inc., Chicago, Ill.
Filed Dec. 24, 1984, Ser. No. 685,364
Term of patent 14 years
U.S. Cl. D6—484

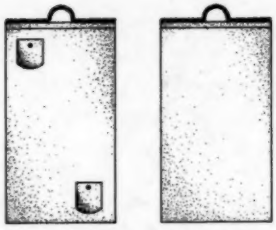
292,459
CHAIR CONTROL
Frank Doerner, 138 Aberdeen Road, Kitchener, Ontario, Canada N2M 2Y7
Filed Aug. 20, 1984, Ser. No. 642,392
Term of patent 14 years
U.S. Cl. D6—500



292,460
CERVICAL PILLOW
Stephen C. Malin, 27931 Winding Way, Malibu, Calif. 90265
Filed Mar. 8, 1985, Ser. No. 709,935
Term of patent 14 years
U.S. Cl. D6—601



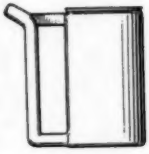
292,461
BATH TOWEL WITH POCKETS
George Shuckman, Rte. 2, Box 238, Clovis, N. Mex. 88101
Filed May 29, 1985, Ser. No. 739,055
Term of patent 14 years
U.S. Cl. D6—608



292,462
DRINKING CUP
Vladislav P. Petrasek, P.O. Box 113, El Segundo, Calif. 90245
Filed May 28, 1985, Ser. No. 738,371
Term of patent 14 years
U.S. Cl. D7—5

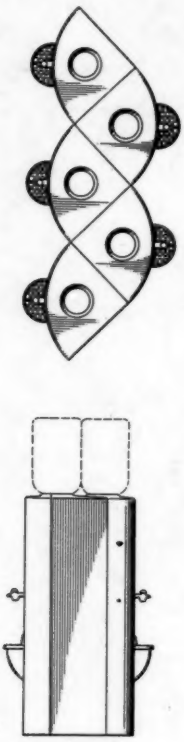
292,463
DRINKING CUP
Vladislav P. Petrasek, P.O. Box 113, El Segundo, Calif. 90245
Filed May 28, 1985, Ser. No. 738,372
Term of patent 14 years
U.S. Cl. D7—5

292,464
DRINKING CUP
Vladislav P. Petrasek, P.O. Box 113, El Segundo, Calif. 90245
Filed May 28, 1985, Ser. No. 738,399
Term of patent 14 years
U.S. Cl. D7—9



292,465
MUG
Ardis Session, 15477 Warwick St., Detroit, Mich. 48223
Filed Jul. 12, 1985, Ser. No. 754,075
Term of patent 14 years
U.S. Cl. D7—9

292,466
BOTTLED WATER DISPENSER
Richard C. Runyon, Los Angeles, Calif., assignor to Arrowhead Puritas Waters, Inc., Monterey Park, Calif.
Division of Ser. No. 529,141, Sep. 2, 1983, Pat. No. 289,724. This application Mar. 21, 1986, Ser. No. 845,430
Term of patent 14 years
U.S. Cl. D7—306



292,467

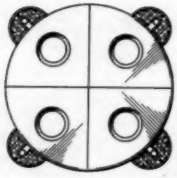
BOTTLED WATER DISPENSER

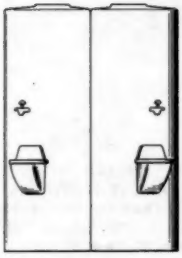
Richard C. Runyon, Los Angeles, Calif., assignor to Arrowhead Puritas Waters, Inc., Monterey Park, Calif.

Division of Ser. No. 529,141, Sep. 2, 1983, Pat. No. Des. 289,724. This application Mar. 21, 1986, Ser. No. 845,434

Term of patent 14 years

U.S. Cl. D7—306





292,468

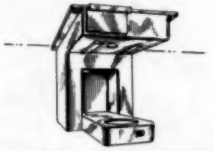
COFFEE MAKER

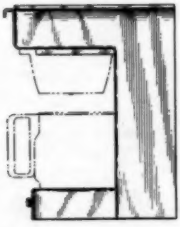
Delvin R. Ryan, Jr., Lake Forest, Ill., assignor to Salton, Inc., Deerfield, Ill.

Filed Oct. 22, 1984, Ser. No. 663,308

Term of patent 14 years

U.S. Cl. D7—309





292,469

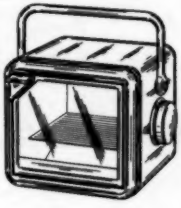
TOASTER OVEN

Takehisa Nakagawa; Mitsutaka Huke, and Chikako Hatta, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Jul. 17, 1985, Ser. No. 756,957

Term of patent 14 years

U.S. Cl. D7—350



292,470

FRY PAN OR SIMILAR ARTICLE

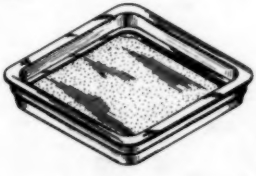
Chang H. Oh, Kyung Ki Do, Rep. of Korea, assignor to J&L Importers, Inc., King of Prussia, Pa.

Filed Nov. 5, 1984, Ser. No. 668,337

Claims priority, application Rep. of Korea, Jun. 7, 1984, 6564

Term of patent 14 years

U.S. Cl. D7—354

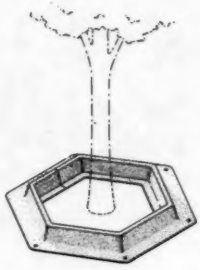


292,471
COOKING UTENSIL OR SIMILAR ARTICLE
Chang H. Oh, Kyung Ki Do, Rep. of Korea, assignor to J&L Importers, Inc., King of Prussia, Pa.
Filed Nov. 5, 1984, Ser. No. 668,401
Claims priority, application Rep. of Korea, Jun. 1, 1984, 6422
Term of patent 14 years
U.S. Cl. D7—360

292,472
FRY PAN OR SIMILAR ARTICLE
Chang H. Oh, Kyung Ki Do, Rep. of Korea, assignor to J&L Importers, Inc., King of Prussia, Pa.
Filed Nov. 5, 1984, Ser. No. 668,336
Claims priority, application Rep. of Korea, Jun. 1, 1984, 6423
Term of patent 14 years
U.S. Cl. D7—360

292,473
ROTISSERIE MOTOR FOR A BARBECUE SPIT
Walter A. Fisher, 402 63rd St., Sp. 247, San Diego, Calif. 92114
Filed Jan. 31, 1985, Ser. No. 696,806
Term of patent 14 years
U.S. Cl. D7—402

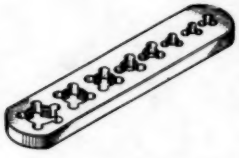
292,474
EDGING UNIT FOR GARDEN LANDSCAPING
William J. Young, Rte. 10, Box 230, McMinnville, Tenn. 37110
Filed Jun. 7, 1985, Ser. No. 742,692
Term of patent 14 years
U.S. Cl. D8—1



292,475
PLANT STAKE
Robert J. Kitchen, 2721 Third Ave. West, Hibbing, Minn. 55746
Filed Nov. 1, 1985, Ser. No. 793,783
Term of patent 14 years
U.S. Cl. D8—1

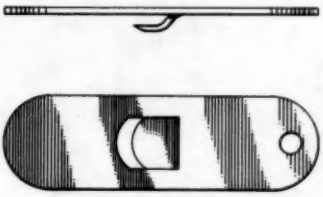
292,476
ELECTRO-MAGNET PROBE
Ronald T. Palmateer, Box 227 Highway 74, Ione, Oreg. 97843
Filed Sep. 26, 1984, Ser. No. 654,747
Term of patent 14 years
U.S. Cl. D8—14

292,477
WRENCH
Chern Shyi-Kuan, No. 262, Peitou Road, Peitou Li, Tsau-Tun Town, Nan-Tou Hsien, Taiwan
Filed Mar. 21, 1984, Ser. No. 591,951
Term of patent 14 years
U.S. Cl. D8—21



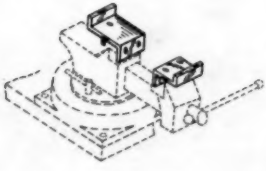
292,478
CHAMPAGNE BOTTLE OPENER
Floyd W. Friedline, R.R. 1, Box 390, Moro, Ill. 62067
Filed May 29, 1985, Ser. No. 739,053
Term of patent 14 years
U.S. Cl. D8—33

292,479
FLIP TOP CAN OPENER OR SIMILAR ARTICLE
Keith M. Beauchan, 1232 Makaloa St., Apt. 7, Honolulu, Hi. 96814
Filed Feb. 25, 1985, Ser. No. 704,715
Term of patent 14 years
U.S. Cl. D8—40



292,480
PORTABLE STAPLE HOLDER
Frank S. Smirne, 1240 Washington St., Whitehall, Pa. 18052
Filed Nov. 9, 1984, Ser. No. 669,676
Term of patent 14 years
U.S. Cl. D8—71

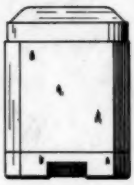
292,481
PAIR OF EXTENDER JAWS FOR A VISE
Arthur Wolff, 210 Laduemont Dr., St. Louis, Mo. 63141
Filed Aug. 27, 1984, Ser. No. 644,859
Term of patent 14 years
U.S. Cl. D8—74



292,482
COMBINED LATCH OPERATING HANDLE AND HANDLE HOUSING
Lee S. Weinerman, Strongsville, and Michael J. Rachocki, Brunswick, both of Ohio, assignors to The Eastern Company, Cleveland, Ohio
Filed Apr. 18, 1984, Ser. No. 601,651
Term of patent 14 years
U.S. Cl. D8—302

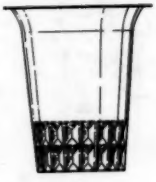
292,483
DUAL COMPARTMENT SANDWICH PACKAGE
Nicholas D. Commisso, Victor; Edwin R. De Cook, Oaks Corner, both of N.Y.; Ralph E. Hisle, Frankfort, Ill., and Donald Rowe, Newark, N.Y., assignors to McDonald's Corporation, Oak Brook, Ill.
Filed May 20, 1985, Ser. No. 735,946
Term of patent 14 years
U.S. Cl. D9—341

292,484
COMBINED DISPENSING CONTAINER AND SOLID STICK PRODUCT
James M. Keeler, Ridgewood, and John A. Grip, Wayne, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Nov. 14, 1984, Ser. No. 671,651
Term of patent 14 years
U.S. Cl. D9—370

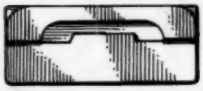


292,485
BOTTLE
William J. Britt, Greenville, S.C., assignor to The Dow Chemical Company, Midland, Mich.
Filed Aug. 31, 1984, Ser. No. 646,198
Term of patent 14 years
U.S. Cl. D9—375

292,486
PACKAGING CUP OR THE LIKE
Frank S. Tyler, Kent, England, assignor to Lever Brothers Company, New York, N.Y.
Filed Apr. 30, 1985, Ser. No. 728,900
Claims priority, application United Kingdom, Oct. 30, 1984, 1022982
Term of patent 14 years
U.S. Cl. D9—394



292,487
CARRYING CARTON
John E. Kea, New Castle, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed Feb. 10, 1984, Ser. No. 578,980
Term of patent 14 years
U.S. Cl. D9—432

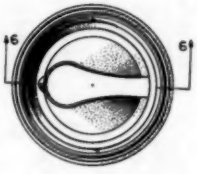


292,488
CONTAINER COVER
Earl Hoyt, Waldwick, N.J., assignor to Block Drug Co., Inc., Jersey City, N.J.
Filed Jan. 15, 1985, Ser. No. 691,674
Term of patent 14 years
U.S. Cl. D9—443

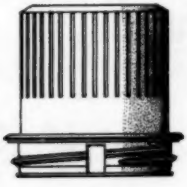
292,489
POURING ATTACHMENT FOR BOTTLES
Mathias M. Kowollik, Cincinnati; Jack A. Sneller, Wyoming, and George S. Speidel, III, Cincinnati, all of Ohio, assignors to The Proctor & Gamble Company, Cincinnati, Ohio
Filed Oct. 9, 1984, Ser. No. 658,732
Term of patent 14 years
U.S. Cl. D9—447

292,490
POURING ATTACHMENT FOR BOTTLES
Mathias M. Kowollik; Jack A. Sneller, and George S. Speidel, III, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Oct. 9, 1984, Ser. No. 658,733
Term of patent 14 years
U.S. Cl. D9—447

292,491
POURING ATTACHMENT FOR BOTTLES
Samuel Ross, Cincinnati, Ohio, and John Pardo, Yonkers, N.Y., assignors to The Proctor & Gamble Company, Cincinnati, Ohio
Filed Oct. 9, 1984, Ser. No. 658,734
Term of patent 14 years
U.S. Cl. D9—447



292,492
COMBINED CLOSURE AND MEASURING CUP
Samuel Ross, Cincinnati, Ohio, and John Pardo, Yonkers, N.Y., assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Oct. 9, 1984, Ser. No. 658,731
Claims priority, application ,
Term of patent 14 years
U.S. Cl. D9—453

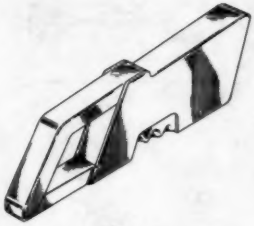


292,493
DIGITAL ELECTRONIC THERMOMETER OR SIMILAR ARTICLE
Indle G. King, Mercer Island, Wash., assignor to John Fluke Mfg., Co., Inc., Everett, Wash.
Filed May 17, 1985, Ser. No. 735,145
Term of patent 14 years
U.S. Cl. D10—57

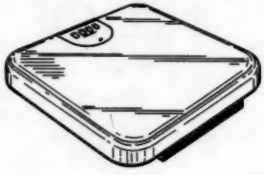
292,494
DIGITAL ELECTRONIC THERMOMETER OR SIMILAR ARTICLE
Indle G. King, Mercer Island, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.
Filed May 17, 1985, Ser. No. 735,356
Term of patent 14 years
U.S. Cl. D10—57

292,495
ALIGNMENT TEMPLATE OR SIMILAR ARTICLE
David P. Eisenhauer, Charlotte, N.C., assignor to NCR Corporation, Dayton, Ohio
Division of Ser. No. 652,361, Sep. 19, 1984. This application Feb. 9, 1987, Ser. No. 12,907
Term of patent 14 years
U.S. Cl. D10—64

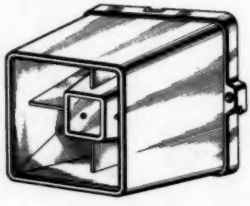
292,496
CLAMP-ON AMMETER-WATTMETER
Daniel Arnoux; Claude Genter, and Christian Anton, all of 190 rue Championnet, 75890 Paris Cedex 18, France
Filed Mar. 8, 1985, Ser. No. 709,577
Term of patent 14 years
U.S. Cl. D10—79



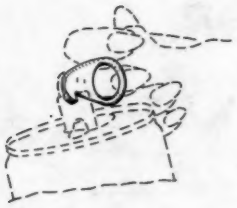
292,497
BATHROOM SCALE
Günter Storsberg, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany
Filed Oct. 19, 1984, Ser. No. 662,954
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1984, 5 MR 9475
Term of patent 14 years
U.S. Cl. D10—92



292,498
SIREN
Takatoshi Hayashi, Kohnosu, Japan, assignor to Kabishi Electric Co., Japan
Filed May 29, 1985, Ser. No. 738,956
Term of patent 14 years
U.S. Cl. D10—120



292,499
FINGER RING WITH BEVERAGE CAN-OPENING HOOK
Loren K. Eddy, 5100 S. 1050 West, Ogden, Utah 84405
Filed Apr. 15, 1985, Ser. No. 723,555
Term of patent 14 years
U.S. Cl. D11—2

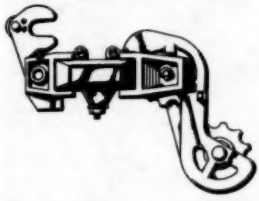


292,500
FINGER RING
Jere B. Ford, Jr., P.O. Box 821, Dyersburg, Tenn. 38025-0821
Filed Feb. 14, 1985, Ser. No. 701,635
Term of patent 14 years
U.S. Cl. D11—26

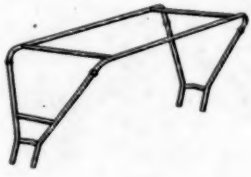
292,501
EARRING
Sandra Jones, 607 S. Fiske Blvd., Cocoa, Fla. 32922
Filed Dec. 14, 1984, Ser. No. 681,613
Term of patent 14 years
U.S. Cl. D11—61

292,502
JEWELRY KEY
Sherrie Croker, Silver Springs, Md.; Charles S. DiLullo, Lafayette Hill; David W. Brahin, Springfield; Elsie Brown, Berwyn, and D. Bruce Pollock, Horsham, all of Pa., assignors to The American College, Bryn Mawr, Pa.
Filed Jan. 16, 1985, Ser. No. 692,047
Term of patent 14 years
U.S. Cl. D11—81

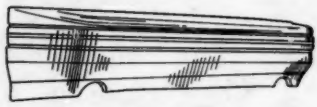
292,503
BICYCLE REAR DERAILLEUR
Henri Juy, Dijon, France, assignor to Etablissements le Simplex, France
Filed May 9, 1984, Ser. No. 608,559
Claims priority, application France, Sep. 11, 1983, 83157
Term of patent 14 years
U.S. Cl. D12—124



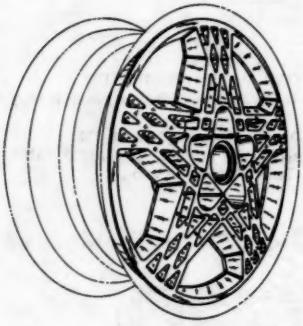
292,504
CANOE CARRIER FOR ALL-TERRAIN VEHICLE
Gérald Racicot, 5521, rue St. Joseph, Valcourt, Quebec, Canada J0L 2L0
Filed Feb. 4, 1985, Ser. No. 697,646
Term of patent 14 years
U.S. Cl. D12—156



292,505
CAR REAR BUMPER
Yasuji Oda, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Dec. 6, 1985, Ser. No. 805,557
Term of patent 14 years
U.S. Cl. D12—169

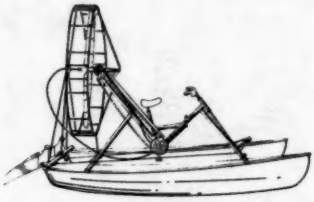


292,506
VEHICLE WHEEL CENTER
James P. McKeon, Franklin, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Nov. 22, 1985, Ser. No. 806,244
Term of patent 14 years
U.S. Cl. D12—211

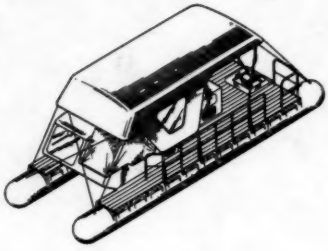


292,507
VEHICLE WHEEL CENTER
Donald J. Reid, Plymouth, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Aug. 12, 1985, Ser. No. 764,824
Term of patent 14 years
U.S. Cl. D12—211

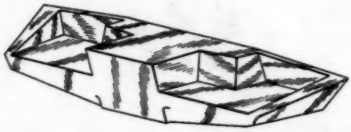
292,508
TWIN HULL VESSEL WITH PROPELLER
Antonio Ubezio, via Torino 76/78, 28069 Trecate, Italy
Filed Dec. 16, 1985, Ser. No. 809,611
Claims priority, application Italy, Sep. 24, 1985, 36190/85[U]
Term of patent 14 years
U.S. Cl. D12—306



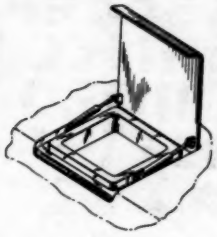
292,509
PONTOON BOAT
Ernesto C. Curiel C., Consedo Nacional de Investigaciones Cientificas y Technologicas, Conicit, Apartado 70617, Los Ruices, Caracas, Venezuela
Filed May 31, 1985, Ser. No. 740,033
Term of patent 14 years
U.S. Cl. D12—316



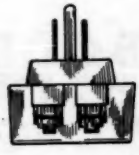
292,510
TRANSOM SHROUD FOR THE REAR END OF A BOAT
Francis M. Hawkins, 112 Elwood Dr., Jacksonville, Ark. 72076, and Neil E. Baker, 3420 McCord, North Little Rock, Ark. 72116
Filed Dec. 13, 1984, Ser. No. 681,267
Term of patent 14 years
U.S. Cl. D12—317



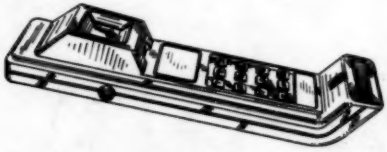
292,511
POWER BOAT HATCH
Allan Brown, North Miami Beach; Robert B. Gowens, Plantation, and Valentine Jenkins, Pembroke Lakes, all of Fla., assignors to Cigarette Racing Team, Inc., North Miami Beach, Fla.
Filed Oct. 30, 1985, Ser. No. 792,974
Term of patent 14 years
U.S. Cl. D12—317



292,512
TELEPHONE MODEM SURGE PROTECTOR
Edward L. Hames, Peterborough, N.H., assignor to Curtis Manufacturing Company, Inc., Peterborough, N.H.
Filed Oct. 27, 1986, Ser. No. 923,745
Term of patent 14 years
U.S. Cl. D13—11

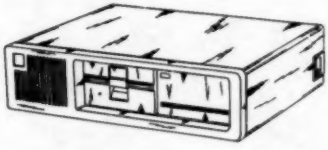


292,513
HANDSET TELEPHONE
Paul Gilberton, Saint-Ouen L'Aumone, France, assignor to Thomson-CSF Telephone S.A., Colombes, France
Filed Nov. 12, 1985, Ser. No. 804,737
Claims priority, application France, Jul. 22, 1985, 853 497
Term of patent 14 years
U.S. Cl. D14—53

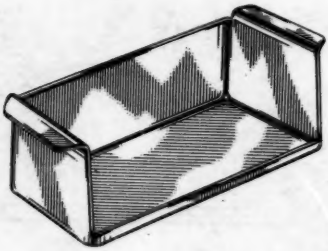


292,514
RADIO CASE WITH ANTENNA
Jack N. Holcomb, P.O. Box 23130, Ft. Lauderdale, Fla. 33307
Filed Mar. 27, 1985, Ser. No. 716,637
Term of patent 14 years
U.S. Cl. D14—76

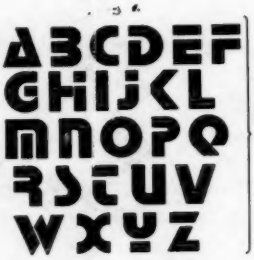
292,515
COMPUTER CABINET
Randall W. Martin, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Sep. 27, 1984, Ser. No. 655,177
Term of patent 14 years
U.S. Cl. D14—100



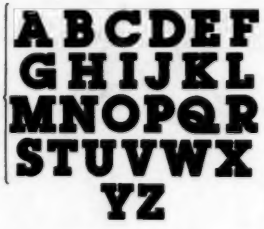
292,516
RACK FOR HOLDING LEFTOVER FOOD CONTAINERS FOR REFRIGERATED STORAGE
Robert Y. Wolff, 525 Constellation Rd., Wickenburg, Ariz. 85358
Division of Ser. No. 487,876, Apr. 22, 1983. This application Jun. 10, 1986, Ser. No. 872,764
Term of patent 14 years
U.S. Cl. D15—89

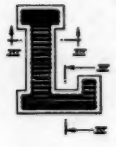


292,517
FONT OF SIGN LETTERS OR THE LIKE
James M. O'Neal, Chatsworth, Calif., assignor to Jim O'Neal Distributing, Inc., Chatsworth, Calif.
Filed Nov. 18, 1985, Ser. No. 798,942
Term of patent 14 years
U.S. Cl. D18—30

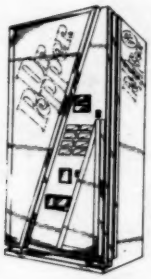


292,518
FONT OF SIGN LETTERS OR THE LIKE
James M. O'Neal, Chatsworth, Calif., assignor to Jim O'Neal Distributing, Inc., Chatsworth, Calif.
Filed Nov. 18, 1985, Ser. No. 805,456
Term of patent 14 years
U.S. Cl. D18—30



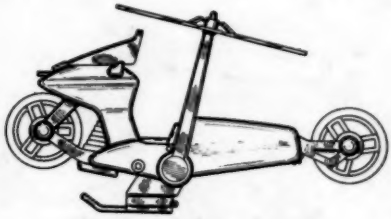


292,519
VENDING MACHINE OR SIMILAR ARTICLE
James H. Sullivan, Gurnee, Ill., assignor to Dr. Pepper, Dallas, Tex.
Filed Oct. 18, 1984, Ser. No. 662,005
Term of patent 14 years
U.S. Cl. D20—5



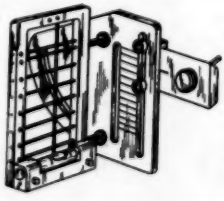
292,520
DICE AGITATOR
Jack Stuckmayer, 1102 Delaware Ave., West St. Paul, Minn. 55118
Continuation-in-part of Ser. No. 631,389, Jul. 16, 1987. This application Mar. 1, 1985, Ser. No. 707,133
Term of patent 14 years
U.S. Cl. D21—41

292,521
TOY VEHICLE
Robert K. Allen; Howard N. Bollinger; David A. Myers, all of Cincinnati, Ohio; Eric J. Simpson, Newport, and W. Grey Williams, Covington, both of Ky., assignors to Kenner Parker Toys Inc., Beverly, Mass.
Filed Feb. 14, 1985, Ser. No. 701,591
Term of patent 14 years
U.S. Cl. D21—77

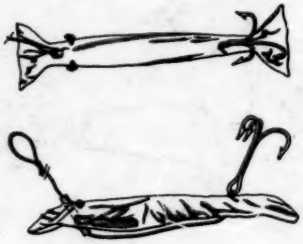


292,522
TENNIS RACQUET
Larry D. Thompson, 13030 Audelia, #1206, Dallas, Tex. 75243
Filed Mar. 12, 1985, Ser. No. 710,667
Term of patent 14 years
U.S. Cl. D21—212

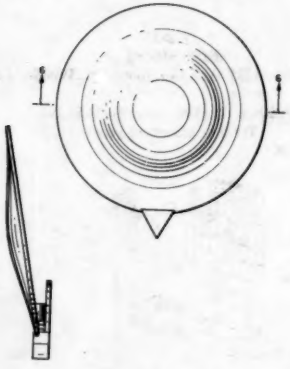
292,523
BOWSIGHT
Richard M. Raab, 5221 W. Lake Shore Dr., Wonder Lake, Ill. 60097
Filed Sep. 24, 1984, Ser. No. 653,296
Term of patent 14 years
U.S. Cl. D22—107



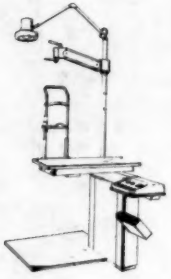
292,524
FISHING LURE
Mark Nichols, 633 Bryant Ave., Stuart, Fla. 33494
Filed Mar. 29, 1985, Ser. No. 717,566
Term of patent 14 years
U.S. Cl. D22—126



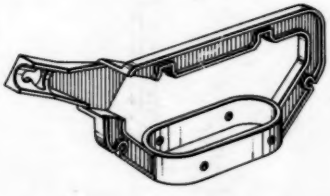
292,525
SCONCE
Jerry Van Deelen, New York, N.Y., assignor to Les Prismatiques, Inc., New York, N.Y.
Filed Feb. 11, 1985, Ser. No. 700,718
Term of patent 14 years
U.S. Cl. D26—85



292,526
STAND FOR MOUNTING OPHTHALMOLOGIC INSTRUMENTS
Toshio Nakayama, Kawaguchi, Japan, assignor to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 29, 1985, Ser. No. 728,268
Claims priority, application Japan, Nov. 2, 1984, 59-45378
Term of patent 14 years
U.S. Cl. D24—1.1



292,527
HANDLE WITH SIDEARM FOR A DIAGNOSTIC URINEMETER UNIT
James K. Bullock, Burbank; William G. Bloom, Northridge; Bernard Siegel, Los Angeles, and Richard Lobodzinski, Sunland, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.
Filed Mar. 14, 1985, Ser. No. 711,867
Term of patent 14 years
U.S. Cl. D24—17

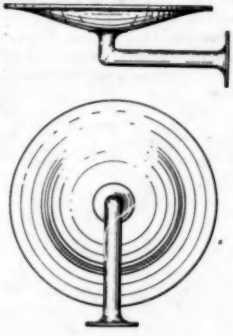


292,528
DENTAL CAPSULE
Edward A. Weissenburger, Mercerville, N.J., assignor to Johnson & Johnson Dental Products Company, East Windsor, N.J.
Filed Apr. 15, 1985, Ser. No. 723,606
Term of patent 14 years
U.S. Cl. D24—56

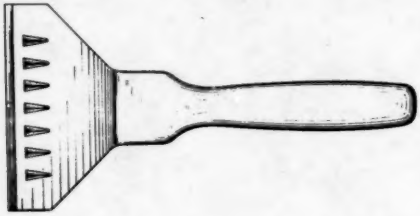
292,529
HYPEREXTENSION ORTHOSIS BRACE
Ants Saare, Sollentuna, Sweden, assignor to Rehband Anatomiska AB, Sollentuna, Sweden
Filed Jan. 9, 1984, Ser. No. 569,437
Claims priority, application Sweden, Jul. 11, 1983, 83-1886
Term of patent 14 years
U.S. Cl. D24—64

292,530
HEADBAND EARPLUGS
Lars-Gunnar L. Andersson, P1 7315 B, Gunnestorp, S-263 Höganäs, Sweden
Filed May 22, 1985, Ser. No. 736,931
Claims priority, application Sweden, Nov. 29, 1984, 84-3195
Term of patent 14 years
U.S. Cl. D24—67

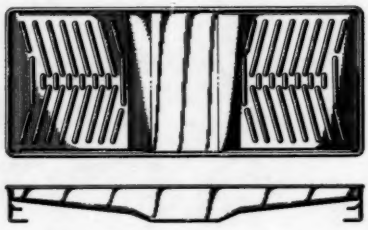
292,531
WALL LAMP
Jerry Van Deelen, New York, N.Y., assignor to Les Prismatiques, Inc., New York, N.Y.
Filed Feb. 11, 1985, Ser. No. 700,717
Term of patent 14 years
U.S. Cl. D26—87



292,532
ICE SCRAPER
Murray Strongwater, 326 Hewlett Neck Rd., Woodmere, N.Y. 11598
Filed Jun. 12, 1986, Ser. No. 873,634
Term of patent 14 years
U.S. Cl. D32—49

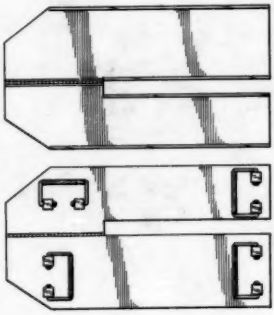


292,533
PAINT TRAY
Edward J. Saraga, 123 Broadbent Rd., Wilmington, Del. 19810
Filed May 12, 1986, Ser. No. 862,513
Term of patent 14 years
U.S. Cl. D32—53.1

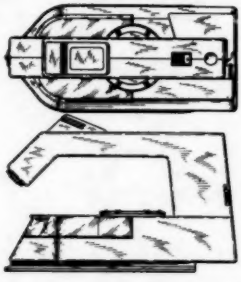


292,534
BOOT DRYING RACK
Louis Basaraba, 650 Bookham Cres., Mississauga, Ontario,, Canada L4Z 1T9, assignor to Louis Basaraba and Shirley Basaraba, both of Mississauga, Canada
Filed Feb. 21, 1986, Ser. No. 834,844
Claims priority, application Canada, Oct. 25, 1985, 25-10-85-2
Term of patent 14 years
U.S. Cl. D32—58

292,535
IRONING BOARD GUARD
Marion P. Myers, Rt. No. 2, Box 386, Purceville, Va. 22132
Filed Apr. 3, 1985, Ser. No. 719,299
Term of patent 14 years
U.S. Cl. D32—66



292,536
TRAVEL IRON
Masao Tsuji, Old Lyme, Conn., assignor to North American Philips Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 663,604, Oct. 22, 1984, Pat. No. Des. 283,934. This application Feb. 14, 1986, Ser. No. 833,452
Term of patent 14 years
U.S. Cl. D32—69

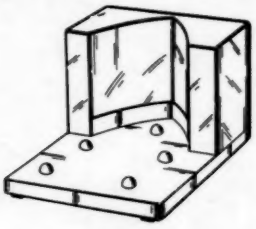


292,537

COMBINED STEAM IRON SUPPORT AND WATER TANK

Cavalli Alfredo, Via Galileo Galilei, 9, Pessano con Bornago, Italy

Filed Jui. 12, 1985, Ser. No. 754,118
Claims priority, application Italy, Jan. 15, 1985, 20522B/85
Term of patent 14 years
U.S. Cl. D32—73

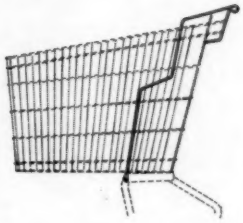


292,538

HANDLE BAR SUPPORT ROD FOR SHOPPING CART

Angoine Trubiano, Pointe aux Trembles, Canada, assignor to Cari-All Inc., Quebec, Canada

Filed May 18, 1984, Ser. No. 612,049
Term of patent 14 years
U.S. Cl. D34—27

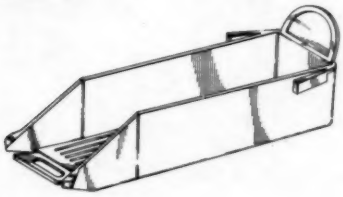


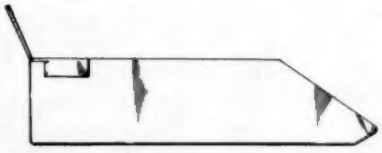
292,539

SLIDABLE TRAY INSERT FOR A MAILBOX

Albert L. Harlow, Jr., Norwalk, and Arthur M. Felske, Westport, both of Conn., assignors to EZ Mail Corporation, Bridgeport, Conn.

Filed Feb. 15, 1985, Ser. No. 701,975
Term of patent 14 years
U.S. Cl. D99—29





LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF OCTOBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AB Siwertell: *See*—
Svensson, Kennet, 4,702,367, Cl. 198-550.900.

Abadi, Khodabandeh. Ore and coal beneficiation method. 4,702,824, Cl. 209-167.000.

Abbe, David C.; and Burt, George A., Jr., to ProQuip, Inc. Apparatus and method for testing the calibration of a hard disk substrate tester. 4,702,101, Cl. 73-1.00R.

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Marchand, Bernard; and Gargouil, Yves M., 4,703,057, Cl. 514-432.000.

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Maund, John K., 4,702,618, Cl. 374-121.000.

Adrian, Gerhard: *See*—
Gawol, Manfred; and Adrian, Gerhard, 4,702,116, Cl. 73-865.600.

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Allen, David; and Winey, Calvin, 4,703,329, Cl. 346-24.000.

Advanced Micro Device, Inc.: *See*—
Bereznak, Bradley J., 4,703,495, Cl. 377-108.000.

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Bemis, Gerald L., 4,703,486, Cl. 371-41.000.

Advanced NMR Systems, Inc.: *See*—
Maudsley, Andrew A., 4,703,267, Cl. 324-307.000.

Advel Limited: *See*—
Bradley, William D.; Alvi, Zia R.; and Lacey, Raymond D., 4,701,993, Cl. 29-523.000.

AE PLC: *See*—
Munro, Robert; and Speaight, David C., 4,702,151, Cl. 92-237.000.

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Arnell, Anders, 4,702,436, Cl. 244-328.000.

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Ruskin, Rodney; and Sacks, Rael, 4,702,787, Cl. 156-244.250.

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Houle, Mario, 4,702,609, Cl. 366-184.000.

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Ochoa, Carlos G.; Aguilar, German C.; and Westlund, Arnold E., Jr., 4,703,221, Cl. 313-332.000.

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Takata, Yatsuka; Yamada, Tadamasa; and Kikuchi, Eiki, 4,702,767, Cl. 75-49.000.

Aiki, Kunio: *See*—
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,702,556, Cl. 350-320.000.

Air Products and Chemicals, Inc.: *See*—
Kleinberg, William T., 4,702,757, Cl. 62-24.000.
Sircar, Shivaji; and Golden, Timothy C., 4,702,749, Cl. 55-33.000.

Airhart, Tom P., to Atlantic Richfield Company. Vent means for closed air system impact-type seismic source. 4,702,344, Cl. 181-121.000.

Aisan Kogyo Kabushiki Kaisha: *See*—
Asano, Hitoshi, 4,703,215, Cl. 310-328.000.
Haruta, Kazumi; and Yoshida, Shigeru, 4,702,216, Cl. 123-520.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Tanaka, Seiya, 4,702,360, Cl. 192-58.00B.

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Hirao, Kouji; Kuwana, Kazutaka; and Asami, Ken, 4,702,123, Cl. 74-526.000.

Akagi, Toshimichi: *See*—
Tadokoro, Tomoo; Okimoto, Haruo; and Akagi, Toshimichi, 4,702,219, Cl. 123-559.000.

Akaike, Junichi: *See*—
Satoh, Masatoshi; and Akaike, Junichi, 4,702,063, Cl. 56-202.000.

Akatsu, Yousuke: *See*—
Yamaguchi, Kirotsugu; Fukushima, Naoto; Akatsu, Yousuke; and Hano, Sunao, 4,702,490, Cl. 280-707.000.

Akazawa, Michitada: *See*—
Ito, Akinori; Akazawa, Michitada; and Kondo, Shiro, 4,702,307, Cl. 165-42.000.

Akechi, Kiyoaki: *See*—
Odani, Yusuke; Akechi, Kiyoaki; and Kuroishi, Nobuhito, 4,702,885, Cl. 419-23.000.

Akimoto, Koji: *See*—
Kojo, Hidehiko; Akimoto, Koji; and Urihara, Kazuhiro, 4,702,962, Cl. 428-418.000.

Akiyama, Kazuhisa: *See*—
Yasuda, Akira; Akiyama, Kazuhisa; Nakao, Toshinari; and Yuasa, Hiroyoshi, 4,703,347, Cl. 358-102.000.

Aksay, Ilhan A.: *See*—
Pyzik, Aleksander J.; and Aksay, Ilhan A., 4,702,770, Cl. 75-236.000.

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Ebregt, Johan L.; and Maatman, Hendrik, 4,702,876, Cl. 264-184.000.
Sengbusch, Gunter V., 4,702,841, Cl. 210-638.000.

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Petit, Andre ; Penicaud, Etienne; Le Coz, Gerard; and Jamet, Daniel, 4,703,394, Cl. 361-413.000.

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Aldrovandi, Mauro; Cianciavicchia, Domenico; and Pedrazzi, Renato, to Hospal A.G. Peristaltic pump provided with a pressure measurement device. 4,702,675, Cl. 417-63.000.

Alexander, Michael P., to ASC Incorporated. Convertible top latch mechanism. 4,702,505, Cl. 292-251.000.

Alexander, Randall W.: *See*—
Troupes, Demetrios; and Alexander, Randall W., 4,703,323, Cl. 340-790.000.

Alfred Teves GmbH: *See*—
Belart, Juan; Burgdorf, Jochen; and Seibert, Wolfram, 4,702,530, Cl. 303-10.000.
Seibert, Wolfram; and Blum, Klaus-Dieter, 4,702,336, Cl. 180-197.000.

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Hideg, Kalman; Hankovsky, Olga H.; Frank, Laszlo ; Bodi, Ilona; and Csak, Jozsef, 4,703,056, Cl. 514-414.000.

Alkem GmbH: *See*—
Ledebrink, Friedrich-Wilhelm, 4,702,862, Cl. 252-628.000.

Allada, Sambasiva R., to Dow Chemical Company, The. Extraction of residues from styrenic polymers. 4,703,105, Cl. 528-483.000.

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Carlisle, Brian R.; Witham, Carl R.; Allan, Donald R.; and Meadows, John W., 4,702,668, Cl. 414-744.00R.

Allen Coding Machines Limited: *See*—
Kempster, Roger B., 4,702,428, Cl. 242-67.200.

Allen, David; and Winey, Calvin, to Advanced Color Technology, Inc. Method and apparatus for controlling sheet material in an ink jet printer. 4,703,329, Cl. 346-24.000.

Allen Engineering Corporation: *See*—
Allen, J. Dewayne, 4,702,640, Cl. 404-75.000.

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Allen, Kenneth C., Jr.; and Findlay, Robert H., to Parker Hannifin Corporation. Electrically controlled starter air valve. 4,702,273, Cl. 137-487.500.

Allen, Louis. Gripper for container caps. 4,702,129, Cl. 81-3.090.

Allied Colloids Limited: *See*—
Flesher, Peter; Farrar, David; Hawe, Malcolm; and Langley, John, 4,702,844, Cl. 210-733.000.

Allied Corporation: *See*—
James, Robert; and Malka, Jacob H., 4,703,307, Cl. 340-347.0SY.
Meyer, Christopher D., 4,702,491, Cl. 280-801.000.

Allred, David; Kadin, Alan; and Pai, Purnachandra, to Ovonic Synthetic Materials Company, Inc. Multilayer decorative coating. 4,702,955, Cl. 428-213.000.

Allroth, Sven E.: *See*—
Engstrom, Ulf F. I.; Allroth, Sven E.; and Mustonen, Olavi M., 4,702,772, Cl. 75-243.000.

Alpine Electronics Inc.: *See*—
Suzuki, Shoji, 4,703,138, Cl. 200-61.58R.

Alps Electric Co., Ltd.: *See*—
Ito, Akinori; Akazawa, Michitada; and Kondo, Shiro, 4,702,307, Cl. 165-42.000.

Aluminum Company of America: *See*—
Brown, Melvin H., 4,702,181, Cl. 110-264.000.
Brown, Melvin H., 4,702,312, Cl. 165-179.000.
Peinecke, Dale R.; Robak, Casimir B., Jr.; and Dubs, Robert A., 4,702,324, Cl. 173-39.000.

Alvi, Zia R.: *See*—
Bradley, William D.; Alvi, Zia R.; and Lacey, Raymond D., 4,701,993, Cl. 29-523.000.

Amacher, Urs: *See*—
Kunnecke, Walter; Amacher, Urs; and Meier, Max, 4,703,150, Cl. 219-535.000.

Amada Company, Limited: *See*—
Okubo, Yasumi; and Morino, Asami, 4,703,143, Cl. 219-69.00W.

Amada Engineering & Service Co., Inc.: *See*—
Koseki, Ryoji, 4,703,487, Cl. 372-33.000.
Lim, Gnian C., 4,703,491, Cl. 372-93.000.

Amaike, Kanetoshi: *See*—
Sako, Shizuka; Amaike, Kanetoshi; and Watanabe, Youji, 4,703,431, Cl. 364-470.000.

Amano, Matsuo; Shida, Masami; Sakamoto, Masahide; Hirayama, Takeshi; and Sasayama, Takao, to Hitachi, Ltd. Method controlling air-fuel ratio. 4,703,430, Cl. 364-431.050.

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Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,703,095, Cl. 526-247.000.

Ambruster, Kurt; Green, Charles J.; and Morris, John M., to GT Development Corporation. Gas venting valve. 4,702,268, Cl. 137-202.000.

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Farrell, Christopher J.; and Tsai, Boh C., 4,702,966, Cl. 428-500.000.

American Colloid Company: *See*—
Mikita, Muneharu; Tanioku, Shozo; and Touda, Takayasu, 4,703,067, Cl. 521-63.000.

American Cyanamid Company: *See*—
Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang-i, 4,703,115, Cl. 536-55.000.
Wissner, Allan, 4,703,130, Cl. 558-169.000.

American Energy Services, Inc.: *See*—
Holland, John F., 4,702,111, Cl. 73-579.000.

American Hospital Supply Corporation: *See*—
Blake, Joseph W., III; and Kaufman, Jack W., 4,702,247, Cl. 128-325.000.

American Telephone and Telegraph Company: *See*—
Crupi, Joseph A.; Hayward, David J.; and Jones, David F., 4,703,416, Cl. 364-200.000.

American Telephone and Telegraph Company AT&T Bell Laboratories: *See*—
Adelmann, Harry W.; and Tomcik, Jame D., 4,703,477, Cl. 370-94.000.
Bruning, John H., 4,703,166, Cl. 250-201.000.
Dolan, Gerald J.; Logan, Ralph A.; Temkin, Henryk; and Wilt, Daniel P., 4,701,995, Cl. 437-129.000.
Dretzka, Ellen E.; Quan, Zoe S.; and Schreiner, Philip A., 4,703,475, Cl. 370-60.000.
Foschini, Gerard J.; and Vannucci, Giovanni, 4,703,474, Cl. 370-18.000.
Frye, Robert C.; and Tai, King L., 4,703,288, Cl. 333-1.000.

American Toy & Furniture Co., Inc.: *See*—
Zalesak, Jon, 4,702,638, Cl. 403-403.000.

Amoco Corporation: *See*—
Unmuth, Eugene E.; and Fleming, Bruce A., 4,703,031, Cl. 502-339.000.

AMP Incorporated: *See*—
Black, Allen C., 4,702,429, Cl. 242-71.800.
Hillbish, Warren C., 4,702,707, Cl. 439-80.000.

Amphenol Corporation: *See*—
Hutter, Harold G.; and Tarrant, Dennis E., 4,702,538, Cl. 439-292.000.

Ampon, Felix A.: *See*—
Tredwell, Gilman; Kraft, Kenneth N.; and Ampon, Felix A., 4,702,174, Cl. 104-172.200.

AMSTED Industries Incorporated: *See*—
Ballun, John V.; and Gain, Lorand H., Jr., 4,702,275, Cl. 137-556.000.
Wykoff, Richard H., 4,702,845, Cl. 210-784.000.

Amstutz, Stanford A.: *See*—
Haselton, E. Fletcher; Amstutz, Stanford A.; and Lenart, Joseph M., 4,703,478, Cl. 370-94.000.

Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., to Univ. of Minnesota, Regents of the; and Twin City Surgical, Inc. Method and apparatus for measuring the isometric muscle strength of multiple muscle groups in the human body. 4,702,108, Cl. 73-379.000.

Andersen, Jorgen B.; and Raskmark, Povl, to Danish Hyperthermia Foundation, The. Electromagnetic applicator for localizing hyperthermia heating in a system. 4,702,262, Cl. 128-804.000.

Andersen, Niels J. Spray-type integrated vegetable blancher and cooler. 4,702,161, Cl. 99-470.000.

Anderson, John C.; Davies, Morris J.; and Lamb, Archie C., to Fiberdynamics, Inc. Fiberoptic temperature/pressure sensor system. 4,703,174, Cl. 250-227.000.

Anderson, Richard N., to Hunter Douglas Inc. Glass spacer construction. 4,702,296, Cl. 160-107.000.

Anderson, Robert A., to Lucas Industries Public Limited Company. Hydraulic anti-skid braking systems for vehicles. 4,702,532, Cl. 303-115.000.

Anderson, Ronald C. Fluid pressure screen printing apparatus, holder and assembly. 4,702,165, Cl. 101-114.000.

Andover Medical Incorporated: *See*—
Robinson, Earl F.; and Bare, Rex O., 4,702,256, Cl. 128-639.000.

Andres, Rudolf; Knoll, Heinz; Petri, Volker; and Pfistner, Harald, to Daimler-Benz Aktiengesellschaft. Seat belt system for vehicles. 4,702,492, Cl. 280-801.000.

Anelva Corporation: *See*—
Tamura, Yoshikazu; and Kitajima, Katsuo, 4,703,190, Cl. 307-2.000.

Angehrn, Jorg A.: *See*—
Chapman, Carroll W.; and Angehrn, Jorg A., 4,703,279, Cl. 324-366.000.

Anno, Nobuo; and Arai, Takeo, to Honda Giken Kogyo Kabuhiki Kaisha. Lubrication oil passage arrangement for water-cooled internal combustion engines. 4,702,204, Cl. 123-196.0AB.

Anquetil, Jacques C. V. Training dummy for combat sports. 4,702,472, Cl. 272-76.000.

Aoki, Yoshiyasu: *See*—
Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, 4,702,977, Cl. 429-194.000.

Aoyama, Naofumi: *See*—
Endo, Shyusuke; Aoyama, Naofumi; Yabuuchi, Toshihiko; Sakuma, Toshiyuki; and Kinugawa, Kiyoshige, 4,702,560, Cl. 350-333.000.

Apert-Herzog Corporation: *See*—
Herzog, William F.; and Nichols, William E., 4,703,356, Cl. 358-160.000.

Apolinar, Ermelinda A.: *See*—
Herrington, Richard A.; Kleman, Thomas G.; and Apolinar, Ermelinda A., 4,702,042, Cl. 51-321.000.

Applied Materials Japan, Inc.: *See*—
Maeda, Kazuo; Tokumasu, Noboru; and Fukuyama, Toshihiko, 4,702,936, Cl. 427-54.100.

Aqua-Edge Industries Australia Pty. Ltd: *See*—
Ferguson, Brian D.; and Jackson, Phillip B., 4,702,034, Cl. 47-33.000.

Arahara, Kohzoh: *See*—
Fukumoto, Hiroshi; Ohnishi, Toshikazu; and Arahara, Kohzoh, 4,702,988, Cl. 430-137.000.

Arai, Katsuhiko: *See*—
Kurachi, Yasuo; Arai, Katsuhiko; Wada, Hiroaki; Watabe, Yoji; and Irako, Sanae, 4,702,900, Cl. 423-345.000.

Arai, Takeo: *See*—
Anno, Nobuo; and Arai, Takeo, 4,702,204, Cl. 123-196.0AB.

Arai, Toshiaki: *See*—
Kinoshita, Toshiyuki; Arai, Toshiaki; Sato, Takao; Kubo, Takashige; Yoshizawa, Yasufumi; and Mori, Hiromichi, 4,703,422, Cl. 364-200.000.

Arakawa, Hideki, to Fujitsu Limited. High voltage precharging circuit. 4,703,196, Cl. 307-246.000.

Arakawa, Hideki, to Fujitsu Limited. Non-volatile random access memory cell. 4,703,456, Cl. 365-185.000.

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Kaufman, Leon; Carlson, Joseph W.; Arakawa, Mitsuaki; McCarten, Barry M.; and Fehn, John H., 4,703,274, Cl. 324-318.000.

Araki, Mikio; Yonamine, Shigeru; and Yukawa, Kouichi, to Idec Izumi Corporation. Printing apparatus for printing both surfaces of chip type article. 4,702,163, Cl. 101-35.000.

Aramaki, Takashi: *See*—
Shiomi, Masuo; and Aramaki, Takashi, 4,703,317, Cl. 340-723.000.

Areauz, Larry D.; and Dudley, Robert H., to Pre-Melt Systems, Inc. Process and apparatus for introducing metal chips into a molten metal bath thereof. 4,702,768, Cl. 75-65.00R.

Arita, Hirotaka, to Kyocera Corporation. Reading apparatus having PIN structure wherein storage and parasitic capacitance differs. 4,703,169, Cl. 250-211.00J.

Arndt, Douglas C.: *See*—
Martin, Timothy S.; and Arndt, Douglas C., 4,702,194, Cl. 118-31.500.

Arnell, Anders, to Affarsverket FFV. Projectile guide mechanism. 4,702,436, Cl. 244-328.000.

Arnold, Michael. Extension cord connector guard. 4,702,541, Cl. 439-304.000.

Aronov, Victor A. Methods for improving mechanical properties of partially stabilized zirconia and the resulting product. 4,703,024, Cl. 501-103.000.

Arpin, Pierre P. Portable heart massage apparatus. 4,702,231, Cl. 128-28.000.

Arturo Salice, S.p.A.: *See*—
Salice, Luciano, 4,701,979, Cl. 16-346.000.

Asada, Shigeki; and Yanagisawa, Hiroshi, to International Business Machines Corp. Processor synchronous image scanner controlling method. 4,703,364, Cl. 358-285.000.

Asahi Denka Kogyo K. K.: *See*—
Kojo, Hidehiko; Akimoto, Koji; and Urihara, Kazuhiro, 4,702,962, Cl. 428-418.000.

Asahi Glass Company Ltd.: *See*—
Tukude, Noboru, 4,702,566, Cl. 350-357.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Ai, Hideo; Ideda, Akihiko; and Sato, Jiro, 4,702,997, Cl. 430-325.000.
Fukuoka, Shinsuke; and Matsuda, Hideki, 4,703,102, Cl. 528-125.000.
Mutoh, Yoshihiko; and Miura, Morikazu, 4,702,836, Cl. 210-500.230.

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Okudaira, Sadao, 4,702,568, Cl. 350-464.000.
Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, 4,702,008, Cl. 33-1.00T.

Asai, Hitohisa. Cryptographic system using pseudocomplements of vector Boolean algebra. 4,703,503, Cl. 380-28.000.

Asami, Ken: *See*—
Hirao, Kouji; Kuwana, Kazutaka; and Asami, Ken, 4,702,123, Cl. 74-526.000.

Asano, Hitoshi, to Aisan Kogyo Kabushiki Kaisha. Stacked piezoelectric ceramics displacement magnifying device. 4,703,215, Cl. 310-328.000.

Asano, Kozo: *See*—
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,703,095, Cl. 526-247.000.

Asanomi, Koji: *See*—
Hatamura, Koichi; and Asanomi, Koji, 4,702,207, Cl. 123-302.000.

ASC Incorporated: *See*—
Alexander, Michael P., 4,702,505, Cl. 292-251.000.

Asdurian, Haig: *See*—
Kannapell, John T.; Asdurian, Haig; and Buttles, Robert F., 4,702,145, Cl. 89-1.803.

ASEA Aktiebolag: *See*—
Dahlquist, Håkan, 4,703,157, Cl. 219-121.0LU.
Stenstrom, Lennart, 4,703,385, Cl. 361-16.000.

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Ashraff, M. Ahmed. Pesticide rinser. 4,702,267, Cl. 134-166.00R.

Astronautics Corporation of America: *See*—
Barclay, John A.; Stewart, Walter F.; Prenger, F. Coyne; Zimm, Carl B.; and Parsons, John P., 4,702,090, Cl. 62-3.000.

Atchison, Topeka and Santa Fe Railway Company, The: *See*—
Gaulding, William R.; Smith, William D.; and Marsh, Nicholas C., 4,702,653, Cl. 410-144.000.

Atlanta Concrete Accessories Inc.: *See*—
Naser, Charles F.; and Aldridge, Steven L., 4,702,641, Cl. 404-97.000.

Atlantic Richfield Company: *See*—
Airhart, Tom P., 4,702,344, Cl. 181-121.000.
Baillie, Lloyd A., 4,702,488, Cl. 280-426.000.
Dean, Barry D., 4,703,085, Cl. 525-91.000.
Sonnenberg, Fred M., 4,703,065, Cl. 521-57.000.

Audeh, Zuheir L., to Center for Blood Research. Non-mechanical buffer circulation apparatus for electrophoresis. 4,702,814, Cl. 204-299.00R.

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Howard, Jonathan M., 4,703,476, Cl. 370-76.000.

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Berry, Robert W., III, 4,703,312, Cl. 340-506.000.

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Tiede, Helge, 4,702,186, Cl. 114-39.000.

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Cornell, William D.; Gilson, Richard W.; Burkholder, Richard A.; and Ausherman, Ronald W., 4,702,261, Cl. 128-754.000.

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Chung, Daniel C.; and Chu, Kwang-Ho, 4,702,961, Cl. 428-379.000.
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Ferreira, Marc; McCormick, John; Bernard, Raymond; Butryn, Joseph; and Clifford, Ronald, 4,702,259, Cl. 128-734.000.

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Widlak, Marinus C. M., 4,702,424, Cl. 241-101.700.

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Banks, John D., 4,702,361, Cl. 192-98.000.
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Ford, Curtis A., 4,702,620, Cl. 374-145.000.

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Ogman, Abraham O., 4,702,960, Cl. 428-367.000.

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McBrady, William J.; and Avelis, Julian P., 4,701,973, Cl. 15-306.00B.

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Kroneis, Herbert; and Offenbacher, Helmut, 4,703,182, Cl. 250-458.100.

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Ahmad, Shamim; Lee, Zion S.; and Katrenick, Stephen E., 4,703,079, Cl. 524-495.000.

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Fry, John J.; Bastijanic, Edward; and Robertson, John W., Jr., 4,703,407, Cl. 363-16.000.
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Bailey, Carl J., to Tandem Computers Incorporated. Parallel grounding scheme. 4,703,195, Cl. 307-147.000.

Baillie, Lloyd A., to Atlantic Richfield Company. Steering system for tractor-trailer units. 4,702,488, Cl. 280-426.000.

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Kenyon, William E.; Baker, Paul L.; Sen, Pabitra N.; and Banavar, Jayanth R., 4,703,277, Cl. 324-323.000.

Baker, Philip G.; and Yurchenco, James, to Presentation Technologies, Inc. Alignment method and cartridge apparatus for apparatus for generating color text and graphics on photographic media. 4,702,578, Cl. 354-15.000.

Balaban, Alvin R.; Harwood, Leopold A.; Patel, Chandrakant B.; and Demmer, Walter H., to RCA Corporation. Frequency division multiplexed analog to digital converter. 4,703,340, Cl. 358-19.000.

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Gardner, Irwin J.; Fusco, James V.; Newman, Neil F.; Kowalski, Ronald C.; Davis, William M.; and Baldwin, Francis P., 4,703,091, Cl. 525-332.300.

Baldwin, Roger A.: *See*—
Barczak, Virgil J.; Baldwin, Roger A.; and Graham, Paul R., 4,702,899, Cl. 423-244.000.

Ball Corporation: *See*—
Pora, Tom; and Grandinetti, Tony, 4,702,098, Cl. 72-351.000.

Ball, Robert J.: *See*—
Banks, John D.; Ball, Robert J.; and Symonds, Denzil J. W., 4,702,362, Cl. 192-98.000.

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Banasiak, Joseph; and Powers, Samuel L., to Miniature Electronics, Inc. Display apparatus for playing card suits. 4,702,479, Cl. 273-148.00R.

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Kenyon, William E.; Baker, Paul L.; Sen, Pabitra N.; and Banavar, Jayanth R., 4,703,277, Cl. 324-323.000.

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Pinza, Mario; Farina, Carlo; Banfi, Silvano; and Pfeiffer, Ugo, 4,703,054, Cl. 514-386.000.

Banks, John D., to Automotive Products plc. Clutch and release bearing assembly. 4,702,361, Cl. 192-98.000.

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Kosaka, Minoru; and Banno, Tutomu, 4,703,367, Cl. 358-339.000.

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Baramac Corporation Limited: *See*—
Stokes, Bruce F., 4,702,047, Cl. 52-156.000.

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Barber, Forest C. Instrument for visual observation utilizing fiber optics. 4,702,571, Cl. 350-516.000.

Barbu, Stefan, to U.S. Philips Corporation. High-frequency amplifier. 4,703,284, Cl. 330-259.000.

Barclay, John A.; Stewart, Walter F.; Prenger, F. Coyne; Zimm, Carl B.; and Parsons, John P., to Astronautics Corporation of America. Magnetic refrigeration apparatus with conductive heat transfer. 4,702,090, Cl. 62-3.000.

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Robinson, Earl F.; and Bare, Rex O., 4,702,256, Cl. 128-639.000.

Bargar, Thomas M.; Broersma, Robert, Jr.; and McCarthy, James R., to Merrell Dow Pharmaceuticals Inc. β-methylene furanethanamines and use as anti-hypertensive agents. 4,703,058, Cl. 514-471.000.

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Barker, Barbara A.; and Hernandez, Irene H., to International Business Machines Corporation. Method for editing a graphic object in an interactive draw graphic system. 4,703,321, Cl. 340-747.000.

Baroody, Anthony J., Jr., to Xerox Corporation. Image rotation. 4,703,515, Cl. 382-46.000.

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Barrett, Bracell P., 4,702,327, Cl. 175-4.000.

Barritt, William D., to Maytag Company, The. Appliance system. 4,703,306, Cl. 340-310.0CP.

Bas-Tex Corporation: *See*—
McDonough, Michael J., 4,702,310, Cl. 165-154.000.

BASF Aktiengesellschaft: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Klahr, Erhard; and Hettche, Albert, 4,702,858, Cl. 252-174.240.
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.
Helwig, Reinhard; Neumann, Peter; Aumueller, Alexander; and Trauth, Hubert, 4,703,072, Cl. 524-99.000.
Ostertag, Werner; Wienand, Henning; and Bauer, Roland, 4,702,775, Cl. 106-304.000.
Steiniger, Michael; and Stroefer, Eckhard, 4,702,803, Cl. 204-59.00R.

BASF Corporation: *See*—
Dexheimer, Edward M., 4,702,741, Cl. 8-115.600.

Bassi, Dario: *See*—
Palau, Joseph; and Bassi, Dario, 4,702,286, Cl. 139-455.000.

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Fry, John J.; Bastijanic, Edward; and Robertson, John W., Jr., 4,703,407, Cl. 363-16.000.

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Steininger, Helmut, 4,703,028, Cl. 502-178.000.

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Heide, Helmut; Etzkorn, Heinz-Werner; Poeschel, Eva; and Steininger, Helmut, 4,702,930, Cl. 427-2.000.

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Bunkoczy, Bela; Wendorff, James A.; and Battin, Walt W., 4,702,969, Cl. 428-635.000.

Bauer, Ludwig; Schneider, Erwin; Rensch, Walter; and Weinhold, Helmut, to Cambridge Instruments GmbH. Guide device for guiding a movable part of an apparatus relative to a fixed part of the apparatus. 4,702,464, Cl. 269-55.000.

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Ostertag, Werner; Wienand, Henning; and Bauer, Roland, 4,702,775, Cl. 106-304.000.

Baumgartner, Richard A.; Dukes, John N.; and Fisher, George A., to Hewlett-Packard Company. Testing and calibrating of amplitude insensitive delay lines. 4,703,251, Cl. 324-57.00R.

Baur, Guenter: *See*—
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.

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Bawa, Rajan, 4,702,574, Cl. 351-162.000.

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Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.

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Blackburn, George L.; Babayan, Vigen K.; Bistrian, Bruce; Moldawer, Lyle L.; and Cotter, Richard, 4,703,062, Cl. 514-552.000.

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Baasner, Bernd; and Klauke, Erich, 4,703,121, Cl. 544-317.000.
Backer, Wolfgang; Wagner, Wolfram; Hahn, Gunther; and Miessen, Ralf, 4,701,980, Cl. 19-0.480.
Garthoff, Bernward; Kazda, Stanislav; and Knorr, Andreas, 4,703,038, Cl. 514-19.000.
Goossens, John; Oppermann, Gunter; and Grape, Wolfgang, 4,702,855, Cl. 252-75.000.
Ingendoh, Axel; Meyer, Horst; and Garthoff, Bernward, 4,703,125, Cl. 548-126.000.
Jonas, Friedrich; Muller, Richard; Merten, Rudolf; and Rottmaier, Ludwig, 4,702,953, Cl. 428-209.000.
Maurer, Fritz, 4,703,122, Cl. 544-319.000.
Petersen, Uwe; Grohe, Klaus; Zeiler, Hans-Joachim; and Metzger, Karl G., 4,703,047, Cl. 514-254.000.
Rasshofer, Werner; Paul, Reiner; Seel, Klaus; and Weber, Christian, 4,703,100, Cl. 528-66.000.
Wehinger, Egbert; and Meyer, Horst, 4,703,119, Cl. 540-544.000.
Wingler, Frank; and Geyer, Otto-Christian, 4,703,097, Cl. 526-279.000.
Wolff, Joachim; Koll, Jochen; Wolf, Karlheinz; Klipper, Reinhold M.; and Lange, Peter M., 4,702,744, Cl. 8-527.000.

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Kit, Malon; and Kit, Saul, 4,703,011, Cl. 435-236.000.

BBC Brown, Boveri & Company, Limited: *See*—
Buchmuller, Reino; and Weissenborn, Bernd, 4,702,553, Cl. 350-96.290.
Jenny, Ernst, 4,702,075, Cl. 60-274.000.
Umbricht, Stefan, 4,703,411, Cl. 363-57.000.

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Vodian, Morton A.; and Bean, Eric S., 4,703,001, Cl. 435-5.000.

Bear Medical Systems, Inc.: *See*—
Chaoui, Samir M., 4,702,240, Cl. 128-204.180.

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Salour, Michael M.; Schoner, Gerhard; Bechtel, James H.; and Kull, Martin, 4,703,175, Cl. 250-227.000.

Becker, Carl G.; Francus, Tova; and Siskind, Gregory W., to Cornell Research Foundation, Inc. Process for inducing selective immunosuppression of antibodies. 4,702,907, Cl. 424-88.000.

Becker, Hans, to Linde Aktiengeselischaft. Process for separating undesirable components from gaseous mixtures. 4,702,750, Cl. 55-48.000.

Beckey, Thomas J.; and Kallas, Kerry M., to Honeywell Inc. Temperature control system for control of a multiplant environmental unit. 4,702,305, Cl. 165-12.000.

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Becklin, Wallace W.: *See*—
Gianopoulos, Thomas J.; and Becklin, Wallace W., 4,702,237, Cl. 128-98.100.

Beckmann, Friedrich K.; Dotsch, Horst; and Hoppe, Wolfgang, to U.S. Philips Corporation. Optical branching device using a liquid crystal. 4,702,557, Cl. 350-330.000.

Beckwith, Paul B.; Bistarkey, Donald S.; Pohedra, Joseph J.; and Trimble, Donald E., to Harris Corporation. Digital radar generator. 4,702,698, Cl. 434-2.000.

Becor Western Inc.: *See*—
Mork, Phillip W.; Kraschnewski, Melvin W.; and Gilmore, Carl D., 4,702,524, Cl. 299-64.000.

Becton Dickinson and Company: *See*—
Campbell, Robert L.; Wagner, Daniel B.; and O'Connell, James P., 4,703,017, Cl. 436-501.000.

Beebe, James C.: *See*—
Higbie, Robert E.; and Beebe, James C., 4,702,287, Cl. 141-4.000.

Beele, Johannes A., to Lycab AB. Sealing system. 4,702,444, Cl. 248-56.000.

Beer, Steve, to Elscint Ltd. Permanent magnet ring assembly for NMR imaging system and method for using such assembly. 4,703,276, Cl. 324-319.000.

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Blackwell, Jennings P.; and Beever, William H., 4,703,081, Cl. 524-592.000.

Beha, Johannes G.; Dreyfus, Russell W.; Kash, Jeffrey A.; and Rubloff, Gary W., to International Business Machines Corporation. Full chip integrated circuit tester. 4,703,260, Cl. 324-158.00R.

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Bein, Raymond E.: *See*—
Bein, David H.; and Bein, Raymond E., 4,703,315, Cl. 340-689.000.

Bektesh, Susan L.: *See*—
Hopp, Thomas P.; Bektesh, Susan L.; Conlon, Paul J., III; and March, Carl J., 4,703,004, Cl. 435-68.000.

Belart, Juan; Burgdorf, Jochen; and Seibert, Wolfram, to Alfred Teves GmbH. Hydraulic brake system with fast-fill cylinder. 4,702,530, Cl. 303-10.000.

Belcher, R. Allan, to Burr-Brown Corporation. Apparatus and methods for digital-to-analogue conversion. 4,703,308, Cl. 340-347.0DA.

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Crupi, Joseph A.; Hayward, David J.; and Jones, David F., 4,703,416, Cl. 364-200.000.

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Prunesti, James; Bell, William D.; Gannaway, Jane P.; O'Boyle, Dolores; and Tedeschi, Anthony, 4,701,964, Cl. 2-406.000.

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Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.

Bemis, Gerald L., to Advanced Micro Devices, Inc. Communication data encoder/decoder component system architecture. 4,703,486, Cl. 371-41.000.

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Bend Research, Inc.: *See*—
Babcock, Walter C.; and Friesen, Dwayne T., 4,702,838, Cl. 210-638.000.

Bender, Herman G.; Shipley, Fred J.; and Vance, Gary C., to Spacelabs, Inc. Portable electrocardiographic recorder. 4,703,372, Cl. 360-96.100.

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Ahlgren, David C.; Bendernagel, Robert E.; Lange, Russell C.; and Revitz, Martin, 4,701,998, Cl. 437-31.000.

Benner, Harold T., Jr.; Leonhardt, Mark A.; and Zdinak, Matthew J., to R. A. Jones & Co. Inc. Volumetric filler for pouch machine. 4,702,289, Cl. 141-125.000.

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Benson, David K.; and Burrows, Richard W., to United States of America, Energy. Phase change thermal energy storage material. 4,702,853, Cl. 252-70.000.

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Kumazawa, Kiyotake; Minamide, Noriaki; Moribe, Yoshihiro; Takahashi, Mikio; Beppu, Osamu; and Mitamura, Masahiro, 4,703,242, Cl. 318-685.000.
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Berchtold, Nikolaus, to Maag Gear-Wheel and Machine Company Limited. Differential Hall-effect gear measure feeler. 4,703,261, Cl. 324-207.000.

Bereznak, Bradley J., to Advanced Micro Device, Inc. High speed frequency divide-by-5 circuit. 4,703,495, Cl. 377-108.000.

Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., to Shop-Vac Corporation. Rotary brush sweeper with easily separable debris pan. 4,701,969, Cl. 15-79.00R.

Berg, Richard A.: *See*—
Silver, Frederick A.; Berg, Richard A.; Birk, David E.; Weadock, Kevin; and Whyne, Conrad, 4,703,108, Cl. 530-356.000.

Berliner, Shlomo; Vered, Areyh; Shmuel, Reich; and Vaige, Moshe, to Motorola, Inc. Forward and reflected power measurement and display. 4,703,259, Cl. 324-95.000.

Berman, Ari P., to Data Translation Inc. Interrupt driven multi-buffer DMA circuit for enabling continuous sequential data transfers. 4,703,449, Cl. 364-900.000.

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Ferreira, Marc; McCormick, John; Bernard, Raymond; Butryn, Joseph; and Clifford, Ronald, 4,702,259, Cl. 128-734.000.

Bernstein, Jeffrey G., to PictureTel Corporation. Method and apparatus for multi-dimensional signal processing using a Short-Space Fourier transform. 4,703,349, Cl. 358-133.000.

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Cabrera, Pedro P.; Berra, Humberto A.; and Doty, Edward N., 4,702,889, Cl. 422-103.000.

Berry, Robert W., III, to Audiosone, Inc. Voice-override alarm system. 4,703,312, Cl. 340-506.000.

Best, Christopher H.; Lakin, David F.; and Simpkins, Timothy M., to Lucas Industries public limited company. Electromagnetically operable valve. 4,702,212, Cl. 123-472.000.

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Beun, Roger A., to Northern Telecom Limited. Electronic equipment drawer. 4,702,535, Cl. 312-308.000.

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Howard, Jonathan M., 4,703,476, Cl. 370-76.000.

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Biermeier, Johann; Olbrich, Otto; and Dierkes, Albert, to Siemens Aktiengesellschaft. Magnetic disk memory having a disk pack seated at both sides in resiliently-designed housing. 4,703,374, Cl. 360-98.000.

Billmers, Robert L.: *See*—
Solarek, Daniel B.; Jobe, Patrick G.; Tessler, Martin M.; Billmers, Robert L.; Lamb, Diane J.; and Tsai, John J., 4,703,116, Cl. 536-104.000.

Bio-Rad Laboratories, Inc.: *See*—
Chu, Daniel Y. M., 4,702,266, Cl. 134-60.000.

Birch, Richard J.: *See*—
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Silver, Frederick A.; Berg, Richard A.; Birk, David E.; Weadock, Kevin; and Whyne, Conrad, 4,703,108, Cl. 530-356.000.

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Beckwith, Paul B.; Bistarkey, Donald S.; Pohedra, Joseph J.; and Trimble, Donald E., 4,702,698, Cl. 434-2.000.

Bistrian, Bruce: *See*—
Blackburn, George L.; Babayan, Vigen K.; Bistrian, Bruce; Moldawer, Lyle L.; and Cotter, Richard, 4,703,062, Cl. 514-552.000.

Bitha, Panayota: *See*—
Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang-i, 4,703,115, Cl. 536-55.000.

Bittner, Reinhold: *See*—
Blumentritt, Martin; Reule, Alfred; and Bittner, Reinhold, 4,703,472, Cl. 370-3.000.

Bivens, Ernest: *See*—
Niehaus, Gerald; and Bivens, Ernest, 4,702,660, Cl. 414-95.000.

Bizard, Andre, to Technos et Compagnie. Methods and devices for fastening bundles of tubes together. 4,702,311, Cl. 165-162.000.

Blach, Josef A. Housing section for a twin screw shaft machine. 4,702,695, Cl. 432-154.000.

Black, Allen C., to AMP Incorporated. Expandable reel assembly. 4,702,429, Cl. 242-71.800.

Black Clawson Company, The: *See*—
Creagan, Richard W., 4,702,800, Cl. 162-300.000.

Black, Jimmy C.; and Roberts, Bruce E., to Harris Corporation. Multiple-layer, multiple-phase titanium/nitrogen adhesion/diffusion barrier layer structure for gold-base microcircuit interconnection. 4,702,967, Cl. 428-620.000.

Blackburn, George L.; Babayan, Vigen K.; Bistrian, Bruce; Moldawer, Lyle L.; and Cotter, Richard, to Baxter Travenol Laboratories, Inc. Parenteral nutrition with medium and long chain triglycerides. 4,703,062, Cl. 514-552.000.

Blackwell, Jennings P.; and Beever, William H., to Phillips Petroleum Company. Poly(arylene sulfide) resin ternary blends. 4,703,081, Cl. 524-592.000.

Blair, Winford, to United States of America, National Aeronautics and Space Administration. Method of manufacturing lightweight thermobarrier material. 4,703,159, Cl. 219-78.120.

Blake, Joseph W., III; and Kaufman, Jack W., to American Hospital Supply Corporation. Ligating clip. 4,702,247, Cl. 128-325.000.

Blake, Larry W.: *See*—
Wright, George M.; and Blake, Larry W., 4,702,733, Cl. 604-34.000.

Blazek, William S., to TRW Inc. Method of assembling molds. 4,702,298, Cl. 164-137.000.

Bloch, Richard J.: *See*—
Sullivan, Dennis; and Bloch, Richard J., 4,702,406, Cl. 228-200.000.

Blocker, William C. Vapor delivery pressure test adapter. 4,702,754, Cl. 55-274.000.

Blohm & Voss AG: *See*—
Schlichthorst, Norbert, 4,702,189, Cl. 114-61.000.

Blue Water Research, Inc.: *See*—
Shaw, Byron, 4,702,033, Cl. 43-43.120.

Blum, Helmut: *See*—
Tesmann, Holger; Blum, Helmut; and Koester, Rita, 4,702,823, Cl. 209-166.000.

Blum, Klaus D.: *See*—
Kircher, Dieter; von Gruenber, Hubertus; and Blum, Klaus D., 4,702,531, Cl. 303-114.000.

Blum, Klaus-Dieter: *See*—
Seibert, Wolfram; and Blum, Klaus-Dieter, 4,702,336, Cl. 180-197.000.

Blumentritt, Martin; Reule, Alfred; and Bittner, Reinhold, to Carl-Zeiss-Stiftung. Wavelength multi/demultiplexer. 4,703,472, Cl. 370-3.000.

BOC Group, Inc., The: *See*—
Theisen, William M.; and Wiseman, Charles D., 4,702,003, Cl. 29-840.000.

Bocchinfuso, Peter, to Gencorp Inc. Automobile weatherstripping. 4,702,039, Cl. 49-490.000.

Bock, Jan; Valint, Paul L.; and Pace, Salvatore J., to Exxon Research and Engineering Company. Enhanced oil recovery with hydrophobically associating polymers containing sulfonate functionality. 4,702,319, Cl. 166-275.000.

Bodenstab, Paul R., to Hewlett-Packard Company. Register circuit used to load, hold, and dump digital logic signals. 4,703,457, Cl. 365-189.000.

Bodi, Ilona: *See*—
Hideg, Kalman; Hankovsky, Olga H.; Frank, Laszlo ; Bodi, Ilona; and Csak, Jozsef, 4,703,056, Cl. 514-414.000.

Bodimer, Gilbert D.: *See*—
Vachhani, Vasantrai A.; and Bodimer, Gilbert D., 4,702,544, Cl. 439-395.000.

Bodine, Albert G. Method and apparatus for sonically stimulating oil wells to increase the production thereof. 4,702,315, Cl. 166-249.000.

Bodine, Albert G. Alternating current magneto hydrodynamic generator. 4,703,207, Cl. 310-11.000.

Bodor, Nicholas S. Orally active heparin salts containing multivalent cationic units. 4,703,042, Cl. 514-56.000.

Bodson, Charles D.: *See*—
Deutermann, Alan R.; and Bodson, Charles D., 4,703,362, Cl. 358-263.000.

Boehmer, Dennis A.; and Piper, Dale R., to Vernay Laboratories, Inc. Fuel filler pipe seal. 4,702,386, Cl. 220-86.00R.

Boehringer Ingelheim KG: *See*—
Struck, Carl-Julius, 4,703,003, Cl. 435-68.000.

Boeing Company, The: *See*—
Dursch, Harry W., 4,703,131, Cl. 136-258.000.
Wang, Timothy, 4,702,441, Cl. 244-204.000.
Weiland, Richard H.; and Franklin, William L., 4,702,442, Cl. 244-216.000.

Bogdanski, Michael, to Nixdorf Computer AG. Hard disk drive with erasing apparatus. 4,703,379, Cl. 360-118.000.

Bohmer, Ralph M., to Research Corporation. Flow cytometer. 4,702,598, Cl. 356-343.000.

Bohnen, Peter; Godesa, Ludvik; Kugler, Reinhard; and Marquardt, Ulrich, to Siemens Aktiengesellschaft. Electric switchgear with a pull-out frame and a switching device that can be inserted therein. 4,703,137, Cl. 200-50.0AA.

Bohnet, Matthias: *See*—
Ulveing, Leon; Linden, Joseph; Bohnet, Matthias; Wies, Georges; and Mack, Raymond, 4,702,182, Cl. 110-347.000.

Bohringer, Wilfried; and Eheim, Franz J., deceased (by Eheim, Helga R., heir), to Robert Bosch GmbH. Fuel injection pump. 4,702,680, Cl. 417-490.000.

Bokerman, Gary N.: *See*—
Dosaj, Vishu D.; Oleson, John D.; and Bokerman, Gary N., 4,702,902, Cl. 423-350.000.

Bonanno, Anthony J., to Hanover Research Corporation. Process for recovering dry solids from aqueous solids mixtures. 4,702,798, Cl. 159-47.100.

Bonanno, Carmine. Guitar controller for a music synthesizer. 4,702,141, Cl. 84-1.160.

Bonapace, Franco B.: *See*—
Cosentino, Roberto F.; and Bonapace, Franco B., 4,702,932, Cl. 427-33.000.

Bond, Raymond G., to Fortel Corporation. Message playback control system for telephone answering machine. 4,703,498, Cl. 379-70.000.

Boomer, John: *See*—
Burgher, Peter H.; and Boomer, John, 4,703,158, Cl. 219-90.000.

Borel, Denis, to SRO Kugellagerwerke, J. Schmid-Roost. Linear bearing for continuous longitudinal movement. 4,702,623, Cl. 384-45.000.

Borel, Georg, to Hermann Wagner GmbH & Co. KG. Sheet forming fabric with reinforced margins. 4,702,952, Cl. 428-193.000.

Borg-Warner Automotive, Inc.: *See*—
Lamarche, Paul E., 4,702,721, Cl. 464-67.000.

Borg-Warner Chemicals, Inc.: *See*—
Giori, Claudio; and Mylonakis, Stamatios G., 4,703,083, Cl. 525-87.000.
Giori, Claudio; and Mylonakis, Stamatios G., 4,703,084, Cl. 525-87.000.

Borgialli, Ronald R., to Electric Power Research Institute, Inc. Stirred microreactor. 4,702,888, Cl. 422-50.000.

Boros, Imre; Venetianer, Pal; and Posfai, Gyorgy, to Richter Gedeon Vegyeszeti Gyar R.T. High copy-number plasmid vectors, production and use thereof. 4,703,012, Cl. 435-320.000.

Bose, Tapan K.: *See*—
Achtermann, Jurgen H.; Bose, Tapan K.; and St-Arnaud, Jean-Marie, 4,702,604, Cl. 356-361.000.

Bostock, Stephen B.: *See*—
Baxter, Anthony G. W.; Bostock, Stephen B.; and Greenwood, David, 4,703,113, Cl. 534-796.000.

Boston University, Trustees of: *See*—
Khader, Mahmoud M.; and Lichtin, Norman N., 4,703,030, Cl. 502-338.000.
Powers, Whitney R.; and Sisun, Henry, 4,702,732, Cl. 604-20.000.

Bouteille, Daniel; Nicolas, Michel; and Prudhomme, Pierre, to La Telemecanique Electrique. Assembly of connections for pneumatic jacks. 4,702,276, Cl. 137-580.000.

Bower, Frank M., to Exxon Production Research Company. Directional acoustic logger apparatus and method. 4,703,459, Cl. 367-25.000.

Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., to Emerson Electric Co. Hermetic terminal assembly and method of manufacturing same. 4,702,976, Cl. 429-181.000.

Boyer, Fred S.; and Boyer, Wayne A. Locking closure. 4,702,388, Cl. 220-305.000.

Boyer, Wayne A.: *See*—
Boyer, Fred S.; and Boyer, Wayne A., 4,702,388, Cl. 220-305.000.

Bozinovich, Matthew J.; and Fontana, Robert M., to Kraft, Inc. Rigid lid system. 4,702,389, Cl. 220-306.000.

BP Chemicals Limited: *See*—
Raufast, Charles, 4,703,094, Cl. 526-65.000.

Brabandt, Earl; and Freeman, Robert R. Sample injection timer for chromatographic apparatus. 4,702,115, Cl. 73-864.850.

Bradley, William D.; Alvi, Zia R.; and Lacey, Raymond D., to Advel Limited. Method of installing threaded fastener. 4,701,993, Cl. 29-523.000.

Brammer, Norman, to Vetco Gray Inc. Wellhead pack-off with undulated metallic seal ring section. 4,702,481, Cl. 277-116.200.

Brandt, Helmut: *See*—
Ding, Kurt; Brandt, Helmut; and Wenzl, Josef, 4,703,326, Cl. 340-870.160.

Brandt, Incorporated: *See*—
Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., 4,703,172, Cl. 250-223.00R.

Brauer, Roger. Tape cassette arrangement. 4,702,434, Cl. 242-198.000.

Braun Aktiengesellschaft: *See*—
Kramer, Carolyn M., 4,702,933, Cl. 427-34.000.

Brayer, Randall R., to Goodyear Tire & Rubber Company, The. High performance all-season tire tread. 4,702,292, Cl. 152-209.00R.

Breglia, Denis R., to United States of America, Navy. Helmet mounted eye tracker using a position sensing detector. 4,702,575, Cl. 351-210.000.

Brent, Richard J.: *See*—
Moss, Brian F.; and Brent, Richard J., 4,702,582, Cl. 354-331.000.

Bresson, Clarence R.; and Mark, Harold W., to Phillips Petroleum Company. Ore flotation and di-alkali metal-di(carboxyalkyl)dithiocarbamate and diammonium-di(carboxyalkyl)dithiocarbamate flotation agents for use therein. 4,702,821, Cl. 209-166.000.

Bridgestone Corporation: *See*—
Kurachi, Yasuo; Arai, Katsuhiko; Wada, Hiroaki; Watabe, Yoji; and Irako, Sanae, 4,702,900, Cl. 423-345.000.
Uno, Takaaki; Dan, Takuya; and Orikawa, Michihiro, 4,702,346, Cl. 181-207.000.

Bridgestone Tire Company Limited: *See*—
Iwata, Norio; Nakamura, Masao; and Takusagawa, Takashi, 4,702,293, Cl. 152-531.000.

Brieger, Emmet F.: *See*—
Colle, Edward A., Jr.; Yates, Donald N., Jr.; and Brieger, Emmet F., 4,702,168, Cl. 102-313.000.

Briggs, Stuart J.; Parker, David J.; and Schluter, Peter, to Lucas Industries Public Limited, Co. Master cylinder. 4,702,078, Cl. 60-585.000.

Briles, Paul R.: *See*—
Salter, Larry, 4,702,658, Cl. 411-426.000.

Brinkman, Earl H.; and Morrison, Bruce L., to General Electric Company. Slip ring expansion joint. 4,702,671, Cl. 415-134.000.

Brisset, Jean-Paul: *See*—
Lombard, Claude; Brisset, Jean-Paul; Marais, Jean-Luc; and Catier, Gerard, 4,702,208, Cl. 123-339.000.

British Telecommunications plc: *See*—
McGrail, Joseph M., 4,703,201, Cl. 307-290.000.
Westall, Frederick A.; Lee, Dominic S.; Cameron, Ian R.; and McLintock, Robert W., 4,703,480, Cl. 370-111.000.

Brochstein, Irwin H., to Pro-Mark Corporation. Drumstick. 4,702,143, Cl. 84-422.00S.

Brockmuller, Uwe: *See*—
Scholl, Herbert; and Brockmuller, Uwe, 4,702,626, Cl. 384-477.000.

Broddner, Sven M.; Bromster, Leif; Lundell, Ulf; and Pilenvik, Goran S., to Gambro Engstrom AB. Respirator and/or anesthesia supply apparatus. 4,702,242, Cl. 128-205.130.

Broersma, Robert, Jr.: *See*—
Bargar, Thomas M.; Broersma, Robert, Jr.; and McCarthy, James R., 4,703,058, Cl. 514-471.000.

Brois, Stanley J.: *See*—
Gutierrez, Antonio; Brois, Stanley J.; Ryer, Jack; and Deen, Harold E., 4,702,850, Cl. 252-48.200.

Bromster, Leif: *See*—
Broddner, Sven M.; Bromster, Leif; Lundell, Ulf; and Pilenvik, Goran S., 4,702,242, Cl. 128-205.130.

Brooks, Kenneth J.; Wilkinson, Michael A.; Hannam, Peter H.; and Whiteside, Neil A., to Smiths Industries Public Limited Company. Catheters. 4,702,252, Cl. 128-344.000.

Brophy, Joseph W.: *See*—
Lawrie, William E.; Powers, Thomas, Jr.; and Brophy, Joseph W., 4,702,112, Cl. 73-629.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Goto, Makoto; Okabe, Takao; and Komori, Akihiro, 4,703,144, Cl. 219-69.00P.
Igi, Hisashi; Yamada, Tomohiro; Higuchi, Tomohisa; Ohta, Eiichi; and Yazawa, Hiroaki, 4,702,630, Cl. 400-82.000.

Brothers, Jack, to United States of America, Air Force. Container latch. 4,702,504, Cl. 292-66.000.

Brovelli, Jacques C. J., to Philiffe J. H. Berna. Touch operated electronic switch for alternating current. 4,703,194, Cl. 307-116.000.

Brown, Franklin C. Ladder caddy. 4,702,446, Cl. 248-210.000.

Brown, James P.; May, Ronald N.; and Randall, David, to Imperial Chemical Industries plc. Polyether polyols, their manufacture and use in polyurethanes production. 4,703,069, Cl. 521-174.000.

Brown, Melvin H., to Aluminum Company of America. Cyclone separator. 4,702,181, Cl. 110-264.000.

Brown, Melvin H., to Aluminum Company of America. Thin rod packing for heat exchangers. 4,702,312, Cl. 165-179.000.

Brown, Richard: *See*—
White, Lawrence K.; and Brown, Richard, 4,702,993, Cl. 430-296.000.

Brudereck, Ulrich; and Gabriel, Klaus-Dieter, to Mannesmann AG. Trolley with cable suspension. 4,702,175, Cl. 105-154.000.

Brumme, Gerhard; and Paur, Konrad, to Siemens Aktiengesellschaft. Transversely excited gas laser and method for the operation thereof. 4,703,490, Cl. 372-86.000.

Brunelli, Timothy A.: *See*—
Cheresnowsky, Michael J.; Brunelli, Timothy A.; and Kim, Tai K., 4,702,895, Cl. 423-54.000.

Bruning, John H., to American Telephone and Telegraph Company, AT&T Bell Laboratories. System for maintaining the optical alignment between stationary and moving equipment in deep-UV lithography. 4,703,166, Cl. 250-201.000.

Brunner, Timothy A., to Perkin-Elmer Corporation, The. Apparatus for measuring overlay error. 4,703,434, Cl. 364-488.000.

Brunswick Corporation: *See*—
Hensel, Robert J.; Wagner, James L.; Hundertmark, James M.; Sheridan, Stephen E.; and Heidel, David W., 4,702,202, Cl. 123-52.00M.

Brusnikin, Arkady F.: *See*—
Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.

Buchmuller, Reino; and Weissenborn, Bernd, to BBC Brown, Boveri & Company, Limited. Fiber-optical sensor for detecting electric arc-discharges. 4,702,553, Cl. 350-96.290.

Bucker, Heinrich: *See*—
Icking, Friedrich; and Bucker, Heinrich, 4,702,197, Cl. 119-14.180.

Bugaut, Andree; and Junino, Alex M., to L'Oreal. Indoaniline and indophenol compounds, a process for their preparation, dyeing compositions containing them and a hair-dyeing process. 4,702,863, Cl. 260-396.00N.

Buhler, Eugen. Installation for the production of horizontally divided flaskless sand block molds. 4,702,301, Cl. 164-168.000.

Buller, Michael J.: *See*—
Jenkins, John E.; Sperinck, John; and Buller, Michael J., 4,702,071, Cl. 60-39.092.

Bunkoczy, Bela; Wendorff, James A.; and Battin, Walt W., to Garrett Corporation, The. Laminate bonding methods for nonferrous metallic fluidic devices. 4,702,969, Cl. 428-635.000.

Bunza, Peter; and Cross-Hansen, Alan, to Denpac Corp. High temperature vacuum furnace. 4,702,696, Cl. 432-205.000.

Burckhardt, Manfred; and Zimmer, Richard, to Daimler-Benz Aktiengesellschaft. Control system for an automatic all wheel drive vehicle. 4,702,337, Cl. 180-197.000.

Burg, Karlheinz: *See*—
Muck, Karl-Friedrich; and Burg, Karlheinz, 4,703,129, Cl. 549-368.000.

Burgdorf, Jochen: *See*—
Belart, Juan; Burgdorf, Jochen; and Seibert, Wolfram, 4,702,530, Cl. 303-10.000.

Burger, Rainer, to President Engineering Corporation. Process for manufacturing multilayer PC boards. 4,702,785, Cl. 156-91.000.

Burgher, Peter H.; and Boomer, John, to Marelco Power Systems, Inc. High frequency welding system. 4,703,158, Cl. 219-90.000.

Burkell, John E., to C-I-L Inc. Production of sodium chlorate. 4,702,805, Cl. 204-95.000.

Burkhardt, Wolfgang; and Kroner, Wolfgang, to Pforzheimer Uhren-Rohwerke PORTA G.m.b.H. Wristwatch stepping motor. 4,703,208, Cl. 310-49.00R.

Burkholder, Richard A.: *See*—
Cornell, William D.; Gilson, Richard W.; Burkholder, Richard A.; and Ausherman, Ronald W., 4,702,261, Cl. 128-754.000.

Burns, Virgil D.; and Martin, Albert E., to Conoco Inc. Air reduction control for oil-treating vessels. 4,702,692, Cl. 431-346.000.

Burr-Brown Corporation: *See*—
Belcher, R. Allan, 4,703,308, Cl. 340-347.0DA.

Burrows, Larry G.: *See*—
Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., 4,702,976, Cl. 429-181.000.

Burrows, Richard W.: *See*—
Benson, David K.; and Burrows, Richard W., 4,702,853, Cl. 252-70.000.

Burt, George A., Jr.: *See*—
Abbe, David C.; and Burt, George A., Jr., 4,702,101, Cl. 73-1.00R.

Busch, Eric: *See*—
Geiger, David J.; Lee, Sunny; and Busch, Eric, 4,702,592, Cl. 355-53.000.

Butka, Kemal. Vessel such as ship, boat and the like with stabilizing means. 4,702,192, Cl. 114-122.000.

Butler, John D., to Mechtrix Corporation. Tool holder for wire cutter. 4,702,136, Cl. 83-694.000.

Butryn, Joseph: *See*—
Ferreira, Marc; McCormick, John; Bernard, Raymond; Butryn, Joseph; and Clifford, Ronald, 4,702,259, Cl. 128-734.000.

Buttles, Robert F.: *See*—
Kannapell, John T.; Asdurian, Haig; and Buttles, Robert F., 4,702,145, Cl. 89-1.803.

B.V. Optische Industrie "De Oude Delft": *See*—
de la Fonteijne, Marcel R., 4,702,249, Cl. 128-328.000.

Bynum, Byron G., to Motorola, Inc. Bipolar programmable memory and method. 4,703,455, Cl. 365-174.000.

C-I-L Inc.: *See*—
Burkell, John E., 4,702,805, Cl. 204-95.000.

Cabannes, Claude, to OMYA S.A. Device for withdrawing and conditioning samples of materials in solid, liquid or gaseous form, for the purpose of analysis thereof. 4,702,114, Cl. 73-863.850.

Cabrera, Pedro P.; Berra, Humberto A.; and Doty, Edward N., to Coulter Electronics Inc. Liquid sampling valve. 4,702,889, Cl. 422-103.000.

Cage, Jerry L.; and Kulp, Jonathan B., to TRW Inc. Control apparatus for a power assist steering system. 4,702,335, Cl. 180-142.000.

Caine, Nathanael T.; and Simon, Jean-Jacques, to Hewlett-Packard Company. Serial network architecture for user oriented devices. 4,703,473, Cl. 370-15.000.

Calabrese, Frank A. Data relay system. 4,703,451, Cl. 364-900.000.

Callaway, James J. Cord holding device. 4,702,443, Cl. 248-51.000.

Calviello, Joseph A. Method for fabricating edge channel FET. 4,701,996, Cl. 437-44.000.

Camaggi, Giovanni; Gozzo, Franco; Signorini, Ernesto; and Palla, Ottorino, to Montedison S.p.A. Method of protecting cultivations of agrarian interest from the action of nonselective herbicides. 4,702,762, Cl. 71-90.000.

Cambridge Instruments GmbH: *See*—
Bauer, Ludwig; Schneider, Erwin; Rensch, Walter; and Weinhold, Helmut, 4,702,464, Cl. 269-55.000.

Cambridge Instruments Inc.: *See*—
Magnante, Peter C., 4,702,576, Cl. 351-214.000.

Cameron, Emmet H. Shoe traction apparatus. 4,702,021, Cl. 36-62.000.

Cameron, Ian R.: *See*—
Westall, Frederick A.; Lee, Dominic S.; Cameron, Ian R.; and McLintock, Robert W., 4,703,480, Cl. 370-111.000.

Camp, Philip G.; Macklen, Eric D.; Hole, Victor H. R.; and Hutcherson, David R., to Standard Telephones and Cables Public Limited Company. Temperature sensors. 4,702,619, Cl. 374-144.000.

Campbell, Robert L.; Wagner, Daniel B.; and O'Connell, James P., to Becton Dickinson and Company. Solid phase assay with visual readout. 4,703,017, Cl. 436-501.000.

Campbell, Roy: *See*—
Price, Anthony G.; and Campbell, Roy, 4,702,351, Cl. 188-71.400.

Canadian Patents and Development Limited: *See*—
Westfall, Alan P.; and Roe, Robert J., 4,702,676, Cl. 417-87.000.

Canon Kabushiki Kaisha: *See*—
Fukumoto, Hiroshi; Ohnishi, Toshikazu; and Arahara, Kohzoh, 4,702,988, Cl. 430-137.000.
Harada, Yoshihito; Kiuchi, Masayoshi; Kobayashi, Ryuichi; and Kawamura, Masaharu, 4,702,585, Cl. 354-410.000.
Imai, Eiichi; Sakashita, Kiichiro; Takagi, Seiichi; and Kukimoto, Tsutomo, 4,702,986, Cl. 430-120.000.
Ishihara, Shunichi; Saito, Keishi; Oda, Shunri; and Shimizu, Isamu, 4,702,934, Cl. 427-39.000.
Iwata, Kazuo; and Koike, Shoji, 4,702,742, Cl. 8-495.000.
Kato, Masataka; Ikemori, Keiji; Tanaka, Tsunefumi; and Tanaka, Kazuo, 4,702,567, Cl. 350-427.000.
Matsumoto, Masakazu; Takiguchi, Takao; Yamashita, Masataka; Umehara, Shoji; and Ishikawa, Shozo, 4,702,982, Cl. 430-72.000.
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,702,981, Cl. 430-69.000.
Saito, Takashi; Nitanda, Hiroshi; Inuzuka, Tsuneki; Tokuhara, Mitsuhiro; and Honda, Haruhisa, 4,702,586, Cl. 355-3.00R.
Tsuda, Tadayuki; and Kurematsu, Katsumi, 4,702,591, Cl. 355-15.000.
Usami, Akihiro, 4,702,590, Cl. 355-14.00C.
Yamada, Yasuyuki; Sato, Yasuhisa; Nakayama, Hiroki; and Oizumi, Kouji, 4,702,581, Cl. 354-126.000.

Capri Lighting: *See*—
Elliott, Franklin E.; and Kudishevich, Anatoly, 4,703,406, Cl. 362-365.000.

Carbon Fuels Corporation: *See*—
Meyer, Edmond G.; and Meyer, Lee G., 4,702,747, Cl. 44-51.000.

Carey, Bruce P., to Integrated Ceilings, Inc. Subceiling construction. 4,702,056, Cl. 52-484.000.

Carl-Zeiss-Stiftung: *See*—
Blumentritt, Martin; Reule, Alfred; and Bittner, Reinhold, 4,703,472, Cl. 370-3.000.
Schilling, Albert; Schuttler, Edwin; Schmekel, Karl-Wilhelm; and Rohde, Axel, 4,702,565, Cl. 350-531.000.

Carlisle, Brian R.; Witham, Carl R.; Allan, Donald R.; and Meadows, John W., to Adepi Technology, Inc. Direct drive robotic system. 4,702,668, Cl. 414-744.00R.

Carlson, Joseph W.: *See*—
Kaufman, Leon; Carlson, Joseph W.; Arakawa, Mitsuaki; McCarten, Barry M.; and Fehn, John H., 4,703,274, Cl. 324-318.000.

Carolina Power & Light Company: *See*—
Sullivan, Dennis; and Bloch, Richard J., 4,702,406, Cl. 228-200.000.

Carrier Corp.: *See*—
Chamberlin, Frederick C.; Whynacht, Charles; Carter, Peter D.; and Wilson, Charles S., 4,703,325, Cl. 340-825.170.

Carter, Ophelia L.: *See*—
Carter, Ransom M.; and Carter, Ophelia L., 4,702,381, Cl. 211-105.200.

Carter, Peter D.: *See*—
Chamberlin, Frederick C.; Whynacht, Charles; Carter, Peter D.; and Wilson, Charles S., 4,703,325, Cl. 340-825.170.

Carter, Ransom M.; and Carter, Ophelia L. Towel protector. 4,702,381, Cl. 211-105.200.

Carter, Robert E.; and Murphy, Donald R., to Piezo Electric Products, Inc. Aerosol dispenser. 4,702,418, Cl. 239-101.000.

Castagna, Joseph T.; and McEligot, Sean, to Priam (Delaware) Corporation. Dynamic absorber device for use with disk drives. 4,703,470, Cl. 369-215.000.

Catala, Gerard; Stowe, Ian; and Henry, Daniel, to Schlumberger Technology Corporation. Method for evaluating the quality of cement surrounding the casing of a borehole. 4,703,427, Cl. 364-422.000.

Caterpillar Inc.: *See*—
Mueller, James P.; and Phelps, Weldon L., 4,702,358, Cl. 192-13.00R.

Cathignol, Dominique: *See*—
Mestas, Jean-Louis; and Cathignol, Dominique, 4,702,248, Cl. 128-328.000.

Catier, Gerard: *See*—
Lombard, Claude; Brisset, Jean-Paul; Marais, Jean-Luc; and Catier, Gerard, 4,702,208, Cl. 123-339.000.

Catoir, Lucien: *See*—
Aboukrat, Simon; Catoir, Lucien; Guatelli, Jean-Luc; and Sobiepanek, Janusz, 4,703,212, Cl. 310-218.000.

Cavlan, Napoleone, to Signetics Corporation. Field-programmable logic device with programmable foldback to control number of logic levels. 4,703,206, Cl. 307-465.000.

Cayzer, Ian S. Pipe and flange alignment tool. 4,701,989, Cl. 29-271.000.

Cedarapids, Inc.: *See*—
Musil, Joseph E., 4,702,642, Cl. 404-118.000.

Celanese Corporation: *See*—
Choe, Eui W., 4,703,096, Cl. 526-248.000.

Center for Blood Research: *See*—
Audeh, Zuheir L., 4,702,814, Cl. 204-299.00R.

Central Glass Company, Limited: *See*—
Abe, Yoshihiro; and Hosono, Hideo, 4,703,019, Cl. 501-13.000.

Centre de Recherche Metallurgiques-Centrum Voor Research in de Metallurgie: *See*—
Economopoulos, Marios, 4,702,812, Cl. 204-208.000.

Centre National de la Recherche Scientifique (CNRS): *See*—
Monsigny, Michel; and Mayer, Roger, 4,703,107, Cl. 530-330.000.

Cepin, Hermann: *See*—
Herre, Emil; Herre, Gerd; Zimmer, Guenter; and Cepin, Hermann, 4,702,461, Cl. 266-216.000.

Ceraso, Arcangelo B., to Morton Thiokol, Inc. Method for applying a portion of a photosensitive film to at least one face of a flat plate having a surface area greater than said portion. 4,702,789, Cl. 156-256.000.

Ceraver, S.A.: *See*—
Kaczerginski, Alexandre, 4,702,873, Cl. 264-135.000.

Certified Technologies Corporation: *See*—
Farnum, Bruce W., 4,702,861, Cl. 252-601.000.

Cerveira de Mello Ribeiro Pinto, Luiz A., to Santal Equipmentos S.A. Chopper harvesters for sugar cane and similar products. 4,702,423, Cl. 241-60.000.

Cetenko, Wiaczeslaw A.: *See*—
Connor, David T.; Cetenko, Wiaczeslaw A.; Unangst, Paul C.; and Johnson, Elizabeth A., 4,703,053, Cl. 514-382.000.

Chaiat, Dov: *See*—
Tal, Reuven; Chaiat, Dov; and Hirsch, Eitan, 4,702,171, Cl. 102-476.000.

Chamberlin, Frederick C.; Whynacht, Charles; Carter, Peter D.; and Wilson, Charles S., to Carrier Corp. Remote subsystem. 4,703,325, Cl. 340-825.170.

Chambers, Joseph W., Sr.; and Nona, Jerry R., to Disposable Waste Systems, Inc. Solid waste comminutor with slotted slide rails and side rails for same. 4,702,422, Cl. 241-46.060.

Chan Industries, Inc.: *See*—
Chan, John R.; and Pitner, Homer S., Jr., 4,703,375, Cl. 360-105.000.

Chan, John R.; and Pitner, Homer S., Jr., to Chan Industries, Inc. Low mass tricomplaint recording device for double sided floppy disk media. 4,703,375, Cl. 360-105.000.

Chang, Shu-Kong: *See*—
Kurkjian, Andrew L.; Chang, Shu-Kong; and Everhart, Ann H., 4,703,460, Cl. 367-31.000.

Chaoui, Samir M., to Bear Medical Systems, Inc. Demand-responsive gas blending system for medical ventilator. 4,702,240, Cl. 128-204.180.

Chapman, Carroll W.; and Angehrn, Jorg A., to Chevron Research Company. Method of interpreting impedance distribution of an earth formation penetrated by a borehole using precursor data provided by a moving logging array having a single continuously emitting current electrode and a multiplicity of potential electrodes. 4,703,279, Cl. 324-366.000.

Chardon, Manfred: *See*—
Gilljam, Hans N.; Chardon, Manfred; Gebald, Gregor; and Illig, Heinz-Peter, 4,702,433, Cl. 242-118.100.

Check, John M.: *See*—
Dzewaltowski, Victor F.; Halvorsen, James; and Check, John M., 4,703,142, Cl. 219-69.00M.

Chen, Bu S., to Hyperion, Inc. Compensating diluter/dispenser. 4,702,393, Cl. 222-1.000.

Chen, Wen T., to GTE Laboratories Incorporated. Clocking pulse generator. 4,703,281, Cl. 328-28.000.

Cheresnowsky, Michael J.; Brunelli, Timothy A.; and Kim, Tai K., to GTE Products Corporation. Purification of molybdenum. 4,702,895, Cl. 423-54.000.

Cherry Corporation, The: *See*—
Happ, Lawrence R.; Stark, Gerald A.; and Drensky, Stephen M., 4,703,147, Cl. 219-10.55C.

Chevron Research Company: *See*—
Chapman, Carroll W.; and Angehrn, Jorg A., 4,703,279, Cl. 324-366.000.
Paulsson, Bjorn N. P., 4,702,343, Cl. 181-106.000.
Wollenberg, Robert H., 4,702,851, Cl. 252-49.600.

Child, Ralph G.: *See*—
Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang-i, 4,703,115, Cl. 536-55.000.

Childs, Henry T., to Temperature Adjusters, Inc. Controlled coal burning and heat collecting method and apparatus. 4,702,179, Cl. 110-215.000.

Chin, Herbert A., to United Technologies Corporation. High modulus shafts. 4,702,782, Cl. 148-429.000.

Chiron, Guy; and Dumont, Andre , to Commissariat a l'Energie Atomique. Gradient meter with thin magnetic layer. 4,703,266, Cl. 324-249.000.

Choe, Eui W., to Celanese Corporation. Novel diacetylenic and polydiacetylenic compositions. 4,703,096, Cl. 526-248.000.

Choung, Moon: *See*—
Weiner, Jerome; and Choung, Moon, 4,702,508, Cl. 294-101.000.

Chow, Ming-Fea; Guthrie, William L.; and Kaufman, Frank B., to International Business Machines Corporation. Method of forming fine conductive lines, patterns and connectors. 4,702,792, Cl. 156-628.000.

Chow, Philip Y., to T. Y. Lin International. Prestressed concrete pressure vessel and method for making such a vessel. 4,702,052, Cl. 52-224.000.

Christen, Daniel G.: *See*—
Hartley, Quentin J. S.; and Christen, Daniel G., 4,702,417, Cl. 239-98.000.

Christie, Robert M.: *See*—
Rickards, Rodney W.; Gill, Melvyn; and Christie, Robert M., 4,703,127, Cl. 549-214.000.

Chu, Daniel Y. M., to Bio-Rad Laboratories, Inc. Destaining apparatus for electrophoresis gels. 4,702,266, Cl. 134-60.000.

Chu, Kwang-Ho: *See*—
Chung, Daniel C.; and Chu, Kwang-Ho, 4,702,961, Cl. 428-379.000.

Chuba Seiko Co., Ltd.: *See*—
Sako, Shizuka; Amaike, Kanetoshi; and Watanabe, Youji, 4,703,431, Cl. 364-470.000.

Chung, Daniel C.; and Chu, Kwang-Ho, to Ausimont, U.S.A., Inc. Method of melt processing and article made of a stabilized copolymer of vinyl chloride and chlorotrifluoroethylene. 4,702,961, Cl. 428-379.000.

Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., to Mobil Oil Corporation. Injectivity profile in steam injection wells via ball sealers. 4,702,316, Cl. 166-272.000.

Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., to Mobil Oil Corporation. Injectivity profile in CO_2 injection wells via ball sealers. 4,702,318, Cl. 166-274.000.

Church, Gregg A.: *See*—
Wheeler, Gilbert A.; Church, Gregg A.; Tucker, Charles L.; and Ward, William R., 4,702,687, Cl. 425-227.000.

Cianciavicchia, Domenico: *See*—
Aldrovandi, Mauro; Cianciavicchia, Domenico; and Pedrazzi, Renato, 4,702,675, Cl. 417-63.000.

Ciba-Geigy AG: *See*—
Moss, Brian F.; and Brent, Richard J., 4,702,582, Cl. 354-331.000.

Ciba-Geigy Corporation: *See*—
Winter, Roland A. E.; Ravichandran, Ramanathan; and Seltzer, Raymond, 4,703,073, Cl. 524-99.000.

Cinram Ltd./Ltee.: *See*—
Philosophe, Isidore, 4,702,369, Cl. 206-312.000.

Cioffi, Dominic A. Truck mounted roller. 4,702,644, Cl. 404-128.000.

Citterio, Paolo, to Maistore S.p.A. Screenless screw mill. 4,702,426, Cl. 241-167.000.

Claessen, Johannes A. H.: *See*—
Slosberg, David K.; Reece, David S.; and Claessen, Johannes A. H., 4,702,950, Cl. 428-95.000.

Clarewood Pty. Ltd.: *See*—
Hunter, Victor L.; and Fisher, Alan D., 4,702,064, Cl. 56-312.000.

Clark, Alonzo W., IV: *See*—
Copley, Michael C.; and Clark, Alonzo W., IV, 4,702,614, Cl. 368-72.000.

Clayton, Colin G.; and Spackman, Ramon, to United Kingdom Atomic Energy Authority. Ore sorting apparatus. 4,702,379, Cl. 209-539.000.

Clean-Tex A/S: *See*—
Lang, Aage, 4,702,133, Cl. 83-30.000.

Click, Billy J. Load cell. 4,702,329, Cl. 177-211.000.

Clifford, Ronald: *See*—
Ferreira, Marc; McCormick, John; Bernard, Raymond; Butryn, Joseph; and Clifford, Ronald, 4,702,259, Cl. 128-734.000.

Cline, Thomas L., to Corra-Board Products Co., Inc. Breadboard panel construction for electronic circuitry. 4,703,395, Cl. 361-417.000.

CMX Systems, Inc.: *See*—
Augustyn, Walter H., 4,702,603, Cl. 356-351.000.

Cockerell, William C., Jr.: *See*—
Storms, Harrison A., Jr.; and Cockerell, William C., Jr., 4,703,444, Cl. 364-561.000.

Coggins, David N.: *See*—
Russell, John L., Jr.; and Coggins, David N., 4,702,228, Cl. 128-1.200.

Coles, Harry J.; and Simon, Richard, to Victoria University of Manchester, The. Liquid crystal information storage device. 4,702,558, Cl. 350-330.000.

Colgate-Palmolive Company: *See*—
Mitchell, Robert L.; and Kiernan, Michael A., 4,702,905, Cl. 424-57.000.

Colle, Edward A., Jr.; Yates, Donald N., Jr.; and Brieger, Emmet F., to Halliburton Company. Sidewall core gun. 4,702,168, Cl. 102-313.000.

Collins, Frederick H.: *See*—
Pontiff, Thomas M.; and Collins, Frederick H., 4,702,868, Cl. 264-50.000.

Colodner, Jesse L.; and Riumbau, Conrad. Token with information data. 4,703,165, Cl. 235-487.000.

Colonial Rubber Works, Inc.: *See*—
Thurman, Glenn A., 4,703,093, Cl. 525-387.000.

Combustion Engineering, Inc.: *See*—
Edwards, Lawrence J., 4,703,264, Cl. 324-220.000.

Commissariat a l'Energie Atomique: *See*—
Chiron, Guy; and Dumont, Andre , 4,703,266, Cl. 324-249.000.
Jeuch, Pierre, 4,703,454, Cl. 365-154.000.

CommTech International: *See*—
Wolfe, James F.; and Sybert, Paul D., 4,703,103, Cl. 528-179.000.

Comparon, Jean-Daniel. Automatic aeration window. 4,702,157, Cl. 98-97.000.

Conax Florida Corporation: *See*—
Miller, Francis M., 4,703,280, Cl. 324-439.000.

Confalone, Pasquale N.: *See*—
Magolda, Ronald L.; Confalone, Pasquale N.; and Johnson, Paul R., 4,702,864, Cl. 260-402.500.

Conlon, Paul J., III: *See*—
Hopp, Thomas P.; Bektesh, Susan L.; Conlon, Paul J., III; and March, Carl J., 4,703,004, Cl. 435-68.000.

Connor, David T.; Cetenko, Wiaczeslaw A.; Unangst, Paul C.; and Johnson, Elizabeth A., to Warner-Lambert Company. Benzothiophenes and benzofurans and antiallergic use thereof. 4,703,053, Cl. 514-382.000.

Conoco Inc.: *See*—
Burns, Virgil D.; and Martin, Albert E., 4,702,692, Cl. 431-346.000.

Conoval, Paul. Writing input and dynamics regeneration device. 4,703,511, Cl. 382-13.000.

Conrad, Peter G., to Sobstad Sailmakers, Inc. Structural sail with grid members. 4,702,190, Cl. 114-103.000.

Consolidated Ceramic Products, Inc.: *See*—
Johnson, Howard B., 4,703,022, Cl. 501-95.000.

Contech Construction Products Inc.: *See*—
Shade, James W.; and Higgs, Robert J., 4,702,502, Cl. 285-231.000.

Continental Gummi-Werke Aktiengesellschaft: *See*—
Ewald, Hans, 4,702,295, Cl. 157-1.000.

Control Technology, Inc.: *See*—
Ferguson, Frank T., 4,703,191, Cl. 307-64.000.
Ferguson, Frank T., 4,703,192, Cl. 307-64.000.

Cooper Industries: *See*—
Weiner, Jerome; and Choung, Moon, 4,702,508, Cl. 294-101.000.

Cooper Industries, Inc.: *See*—
Gaia, Aldino J., 4,703,300, Cl. 337-164.000.

Cooper, J. Carl. Audio to video timing equalizer method and apparatus. 4,703,355, Cl. 358-149.000.

Cooperatieve Vereniging Suiker Unie U.A.: *See*—
Koerts, Kees; and Hanssens, Theodoor R., 4,702,839, Cl. 210-638.000.

Copley, Michael C.; and Clark, Alonzo W., IV, to Off-The-Wall Products. Baseball alarm clock. 4,702,614, Cl. 368-72.000.

Corbett, James P. Oscillating crystal transducer systems. 4,703,216, Cl. 310-338.000.

Corbett, John S., to Fisons plc. Aerosol dispensing metering valve. 4,702,400, Cl. 222-402.200.

Corley, Andrew J., III, to Corley Manufacturing Company. Edging apparatus. 4,702,134, Cl. 83-71.000.

Corley Manufacturing Company: *See*—
Corley, Andrew J., III, 4,702,134, Cl. 83-71.000.

Cornell Research Foundation, Inc.: *See*—
Becker, Carl G.; Francus, Tova; and Siskind, Gregory W., 4,702,907, Cl. 424-88.000.

Cornell, William D.; Gilson, Richard W.; Burkholder, Richard A.; and Ausherman, Ronald W., to Sherwood Medical Company. Biopsy device and method. 4,702,261, Cl. 128-754.000.

Corning Glass Works: *See*—
Alder, Meryle D. W., 4,702,041, Cl. 51-165.710.

Cornish, Francois P. Hydrogen supply unit. 4,702,894, Cl. 422-186.260.

Corra-Board Products Co., Inc.: *See*—
Cline, Thomas L., 4,703,395, Cl. 361-417.000.

Cosentino, Roberto F.; and Bonapace, Franco B., to Pharmindev Ltd. Electrostatic application of coating materials. 4,702,932, Cl. 427-33.000.

Cossey, Jackie J. System for viewing an infant in the rear seat of a vehicle. 4,702,572, Cl. 350-639.000.

Cote, William F., to Eaton Corporation. Method for controlling AMT system including gear neutral sensor signal fault detection and tolerance. 4,702,127, Cl. 74-866.000.

Cotter, Richard: *See*—
Blackburn, George L.; Babayan, Vigen K.; Bistrian, Bruce; Moldawer, Lyle L.; and Cotter, Richard, 4,703,062, Cl. 514-552.000.

Coulombe, David J., to Reliance Comm/Tec Corporation. Method and apparatus for handling and storing cabled spliced ends of fiber optics. 4,702,551, Cl. 350-96.200.

Coulter Electronics Inc.: *See*—
Cabrera, Pedro P.; Berra, Humberto A.; and Doty, Edward N., 4,702,889, Cl. 422-103.000.

Cox, Percy T.: *See*—
Nussbaum, Theodore W.; Tooker, Keith R.; and Cox, Percy T., 4,703,278, Cl. 324-344.000.

Coyle, Peter: *See*—
Glover, Roy A.; Coyle, Peter; and Lee, Denis C., 4,702,701, Cl. 434-270.000.

Crabtree, Austin A.; Crabtree, James R.; and Crabtree, Jeffrey. Chill temperature meter with selectable response. 4,702,617, Cl. 374-109.000.

Crabtree, James R.: *See*—
Crabtree, Austin A.; Crabtree, James R.; and Crabtree, Jeffrey, 4,702,617, Cl. 374-109.000.

Crabtree, Jeffrey: *See*—
Crabtree, Austin A.; Crabtree, James R.; and Crabtree, Jeffrey, 4,702,617, Cl. 374-109.000.

Craig, Alan R.; and Gorman, Eileen G., to Du Pont de Nemours, E. I., and Company. High refractive index haloalkyl-functional shell-core polymers and their use in light scattering immunoassays. 4,703,018, Cl. 436-518.000.

Crawford, Carl R.: *See*—
Gullberg, Grant T.; and Crawford, Carl R., 4,703,424, Cl. 364-414.000.

Creagan, Richard W., to Black Clawson Company, The. Horizontal twin wire paper machine. 4,702,800, Cl. 162-300.000.

Crimestopper Security Products, Inc.: *See*—
Peterson, Larry O., 4,702,094, Cl. 70-241.000.

Cronenberger, Michel; Lateltin, Paul; and Rustant, Robert, to Rhone-Poulenc Specialites Chimiques. Semi-permeable membrane structure that is particularly suitable for plasmapheresis. 4,702,835, Cl. 210-321.720.

Cross-Hansen, Alan: *See*—
Bunza, Peter; and Cross-Hansen, Alan, 4,702,696, Cl. 432-205.000.

Crossley, Leonard S. Cup protecting mixer. 4,702,611, Cl. 366-325.000.

Crossley, Roger, to John Wyeth & Brother Limited. Imidazoquinolines containing other heterocyclic groups, useful as anti-ulcer or anti-secretory agents. 4,703,044, Cl. 514-292.000.

Crotti, Alessandro; and Luc, Roberto R., to Ing. C. Olivetti & C., S.p.A. Ink jet print head and printer. 4,703,332, Cl. 346-140.00R.

Crouse-Hinds Company: *See*—
Smith, Donald C.; Snow, Richard F.; and Pauli, George B., 4,703,403, Cl. 362-268.000.

Crupi, Joseph A.; Hayward, David J.; and Jones, David F., to American Telephone and Telegraph Company; and Bell Telephone Laboratories, Incorporated. Apparatus for locating programs resident on a cartridge of a cartridge programmable communication system. 4,703,416, Cl. 364-200.000.

Csak, Jozsef: *See*—
Hideg, Kalman; Hankovsky, Olga H.; Frank, Laszlo ; Bodi, Ilona; and Csak, Jozsef, 4,703,056, Cl. 514-414.000.

Cselt-Centro Studi e Laboratori Telecommunicazioni S.p.A.: *See*—
Roba, Giacomo, 4,702,759, Cl. 65-13.000.

Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See*—
Di Vita, Pietro; and Potenza, Marcello, 4,703,488, Cl. 372-44.000.

Cuisinarts, Inc.: *See*—
Sontheimer, Carl G.; and Williams, James E., 4,702,162, Cl. 99-495.000.

Culpepper, Mark A., to Ricoh Co., Ltd.; and Ricoh Systems, Inc. Color ink jet drop generator using a solid acoustic cavity. 4,703,330, Cl. 346-75.000.

Cunningham, David W.; and Esakoff, Gregory F., to Lee Colortran, Inc. Portable control unit for theater, television, and film lighting control systems. 4,703,412, Cl. 364-140.000.

Cureton, John E.; and Lyons, Michael R., to Rolls-Royce plc. Gas turbine engine valve control system. 4,702,070, Cl. 60-39.070.

Curles, Curtis T., to Harris Press & Shear, Inc. Rail breaker. 4,702,403, Cl. 225-96.500.

Cusick, Joseph B., III; and Raney, Ty A., to Tweco Products, Inc. Cable connector assembly. 4,702,539, Cl. 439-588.000.

Dahlitz, Ronald R. Patch for muzzle loading rifles. 4,702,028, Cl. 42-90.000.

Dahlman, Willis E.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.

Dahlquist, Håkan, to ASEA Aktiebolag. Robot wrist. 4,703,157, Cl. 219-121.0LU.

Dahm, Horst: *See*—
Huth, Lothar; Dahm, Horst; Moetting, Goetz; and Haeberle, Fritz, 4,703,398, Cl. 362-61.000.

Dahm, Wolfram, to Daimler-Benz Aktiengesellschaft. Tensioning device. 4,702,727, Cl. 474-101.000.

Dai-Ichi Kogyo Seiyaku Co., Ltd.: *See*—
Mori, Shigeo; and Matsumoto, Junichiro, 4,703,114, Cl. 536-4.100.

Daicel Chemical Industries, Ltd.: *See*—
Itoh, Masanori; and Hayashi, Fumihiko, 4,702,958, Cl. 428-323.000.
Sagami, Yosuke; Yamamoto, Akira; Watanabe, Shoji; Isobe, Tomohisa; and Funato, Susumu, 4,703,338, Cl. 357-72.000.

Daido Metal Company Ltd.: *See*—
Mori, Sanae, 4,703,076, Cl. 524-420.000.

Daiken Kogyo Co., Ltd.: *See*—
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,703,095, Cl. 526-247.000.

Daimler-Benz Aktiengesellschaft: *See*—
Andres, Rudolf; Knoll, Heinz; Petri, Volker; and Pfistner, Harald, 4,702,492, Cl. 280-801.000.
Burckhardt, Manfred; and Zimmer, Richard, 4,702,337, Cl. 180-197.000.
Dahm, Wolfram, 4,702,727, Cl. 474-101.000.
Huth, Lothar; Dahm, Horst; Moetting, Goetz; and Haeberle, Fritz, 4,703,398, Cl. 362-61.000.
Lippert, Reinhold, 4,702,333, Cl. 180-140.000.
Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, 4,702,518, Cl. 296-217.000.
von Koch, Arwed, 4,702,503, Cl. 285-330.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Izutsu, Hitoshi; and Yamaguchi, Toshihide, 4,703,074, Cl. 524-262.000.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Hatabe, Yukio; and Komatsubara, Shoji, 4,702,588, Cl. 355-10.000.
Kitamura, Hideaki, 4,703,363, Cl. 358-284.000.

Daiwa Seiko Co, Ltd.: *See*—
Saito, Masaji, 4,702,430, Cl. 242-84.50A.

Daiwa Seiko, Inc.: *See*—
Kaneko, Kyoichi, 4,702,431, Cl. 242-84.50A.
Kaneko, Kyoichi; and Yamaguchi, Nobuyuki, 4,702,432, Cl. 242-84.50A.

Dakin, Wayne R., to Discovision Associates. Multiple variable rate audio message recording and playback. 4,703,368, Cl. 358-342.000.

Damico, Dennis J. Structural adhesive formulations. 4,703,089, Cl. 525-245.000.

Dan Mamtirim: *See*—
Zakai, Avraham; and Shfaram, Adiel, 4,702,280, Cl. 137-853.000.

Dan, Takuya: *See*—
Uno, Takaaki; Dan, Takuya; and Orikawa, Michihiro, 4,702,346, Cl. 181-207.000.

Danish Hyperthermia Foundation, The: *See*—
Andersen, Jorgen B.; and Raskmark, Povl, 4,702,262, Cl. 128-804.000.

Darringer, John A.; and Joyner, William H., Jr., to International Business Machines Corporation. Logic Synthesizer. 4,703,435, Cl. 364-489.000.

Dassler, Armin A., to PUMA AG Rudolf Dassler Sport (formerly PUMA-Sportschuhfabriken Rudolf Dassler KG). Athletic shoe for running disciplines and a process for providing information and/or for exchanging information concerning moving sequences in running disciplines. 4,703,445, Cl. 364-561.000.

Data Translation Inc.: *See*—
Berman, Ari P., 4,703,449, Cl. 364-900.000.

Datlof, Donald I. Quilting aligning apparatus and method. 4,702,184, Cl. 112-117.000.

David, Constant V. External combustion vane engine with conformable vanes. 4,702,205, Cl. 123-236.000.

David, Morgan W. A., to Sony Corporation. Signal interpolators. 4,703,353, Cl. 358-140.000.

Davidson, Delma; and Waechter, Thomas R., to Pallet Master, Inc. Automatic band-saw system. 4,702,137, Cl. 83-718.000.

Davier, Jean-Pierre, to Robatel Slpi. Centrifugal decanters of the pendulum type. 4,702,625, Cl. 384-428.000.

Davies, Geoffrey; and El-Toukhy, Ahmed, to Northeastern University. Process for stabilization of coal liquid fractions. 4,702,748, Cl. 44-56.000.

Davies, Morris J.: *See*—
Anderson, John C.; Davies, Morris J.; and Lamb, Archie C., 4,703,174, Cl. 250-227.000.

Davis, Bobby V. Bottle cap remover. 4,702,130, Cl. 81-3.560.

Davis, Danny J. Demountable flat bed for a fifth wheel tractor. 4,702,510, Cl. 296-35.300.

Davis, John W., to Metal Box p.l.c. Dispenser. 4,702,399, Cl. 222-390.000.

Davis, Lindsey B., Jr. Method for molding concrete blocks or bricks. 4,702,877, Cl. 264-553.000.

Davis, William M.: *See*—
Gardner, Irwin J.; Fusco, James V.; Newman, Neil F.; Kowalski, Ronald C.; Davis, William M.; and Baldwin, Francis P., 4,703,091, Cl. 525-332.300.

de la Fonteijne, Marcel R., to B.V. Optische Industrie "De Oude Delft". Apparatus for the non-contact disintegration of concrements present in a body. 4,702,249, Cl. 128-328.000.

De La Plaza, Alejandro; and Torelli, Guido, to SGS Microelettronica S.p.A. Stabilized current generator with single power supply, particularly for MOS integrated circuits. 4,703,249, Cl. 323-316.000.

Dean, Barry D., to Atlantic Richfield Company. Impact modifier for imide containing copolymers. 4,703,085, Cl. 525-91.000.

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Wiesenberger, Alfred; Schildmann, Jens A.; Kolb, Erich; and Dechent, Hans-Mario, 4,702,922, Cl. 426-51.000.

Dedo Weigert Film GmbH: *See*—
Weigert, Dedo, 4,702,577, Cl. 352-191.000.

Deen, Harold E.: *See*—
Gutierrez, Antonio; Brois, Stanley J.; Ryer, Jack; and Deen, Harold E., 4,702,850, Cl. 252-48.200.

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Whisler, Edwin L.; Griswold, Frederick D., Jr.; and Neagle, Stuart L., 4,702,520, Cl. 297-417.000.

Deffenbaugh, Lynn B.: *See*—
Mikulski, Barry S.; McDonald, Duane L.; and Deffenbaugh, Lynn B., 4,703,148, Cl. 219-10.55E.

Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., to Pall Corporation. Charge modified polyamide membrane. 4,702,840, Cl. 210-638.000.

Degen, Peter J.: *See*—
Pall, David B.; Degen, Peter J.; Gsell, Thomas C.; and Yanakis, Eleni C., 4,702,947, Cl. 428-36.000.

De Jong, Ingolf J. C.: *See*—
Haugen, Per; Haugen, Harold M.; and De Jong, Ingolf J. C., 4,702,046, Cl. 52-144.000.

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Ebert, Charles; Delcroix, Jean L.; Majchrzak, Roland; and Viertel, Lothar, 4,702,513, Cl. 296-97.00H.

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Balaban, Alvin R.; Harwood, Leopold A.; Patel, Chandrakant B.; and Demmer, Walter H., 4,703,340, Cl. 358-19.000.

Demouron, Bernard R.: *See*—
Fontaine, Guy R.; Malizard, Max A.; and Demouron, Bernard R., 4,702,674, Cl. 417-44.000.

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Denpac Corp.: *See*—
Bunza, Peter; and Cross-Hansen, Alan, 4,702,696, Cl. 432-205.000.

Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Klahr, Erhard; and Hettche, Albert, to BASF Aktiengesellschaft. Washing agents containing, as additives, carboxyl-containing copolymers which are neutralized or amidated with amines. 4,702,858, Cl. 252-174.240.

Depa, Louis S., to Rockwell International Corporation. Plate lock-up mechanism for printing presses. 4,702,166, Cl. 101-415.100.

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Derving, Jackie, to Tetra Pak International AB. Bottom design of packing containers. 4,702,410, Cl. 229-184.000.

Design Components, Incorporated: *See*—
Palmin, Simyon; and Hewson, Brian, 4,703,238, Cl. 318-563.000.

DeSoto, Inc.: *See*—
Shay, Gregory D.; Devona, James E.; and Kail, James E., 4,703,080, Cl. 524-555.000.
Detrick, Randy: *See*—
Bado, Charles W.; and Detrick, Randy, 4,703,423, Cl. 364-400.000.
Detsch, Steven G. Dental diagnostic method. 4,702,593, Cl. 355-77.000.
Dettmers, Michael: *See*—
Kussel, Willy; Dettmers, Michael; and Weirich, Walter, 4,702,148, Cl. 91-527.000.
Deutermann, Alan R.; and Bodson, Charles D., to United States of America, Army. Mixed-mode symbol removal method for facsimile data compression. 4,703,362, Cl. 358-263.000.
Deutsch, Ralph, to Kawai Musical Instruments Mfg. Co, Ltd. Fundamental frequency variation for a musical tone generator using stored waveforms. 4,702,142, Cl. 84-1.010.
Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH: *See*—
Mischke, Joachim; and Schroder, Gunter, 4,702,663, Cl. 414-618.000.
DeVaul, Richard L.; and Vaikness, Gerald P. Combination shooter's bench and gun carrying case. 4,702,029, Cl. 42-94.000.
Devona, James E.: *See*—
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DeWalch, Norman B. Lockable meter clamp ring. 4,702,093, Cl. 70-164.000.
Dexheimer, Edward M., to BASF Corporation. Polyoxyalkylene spin finish lubricants having low coefficients of friction. 4,702,741, Cl. 8-115.600.
Didier-Werke AG: *See*—
Muschner, Udo, 4,702,460, Cl. 266-45.000.
Dieckman, John H.: *See*—
Redmond, Donald R.; and Dieckman, John H., 4,703,371, Cl. 360-75.000.
Diepers, Heinrich: *See*—
Schewe, Herbert; and Diepers, Heinrich, 4,703,382, Cl. 360-125.000.
Dierkes, Albert: *See*—
Biermeier, Johann; Olbrich, Otto; and Dierkes, Albert, 4,703,374, Cl. 360-98.000.
Diesel Equipment Limited: *See*—
Olins, Richard C., 4,702,511, Cl. 296-57.00R.
Dighton, Gaylon L.; and Lewis, John W., to Dow Chemical Company, The. Device for measuring the level of a material stored in a tank. 4,702,009, Cl. 33-126.600.
Ding, Kurt; Brandt, Helmut; and Wenzl, Josef, to MTU Motoren-und Turbinen-Union Munchen GmbH. Method and apparatus for measuring pressures in a rotor of a turbomachine. 4,703,326, Cl. 340-870.160.
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Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.
Director General, Agency of Industrial Science and Technology: *See*—
Higuchi, Matsuo; Komura, Osamu; and Kamijo, Eiji, 4,702,869, Cl. 264-65.000.
Discovision Associates: *See*—
Dakin, Wayne R., 4,703,368, Cl. 358-342.000.
Elliott, James E., 4,703,467, Cl. 369-44.000.
Disposable Waste Systems, Inc.: *See*—
Chambers, Joseph W., Sr.; and Nona, Jerry R., 4,702,422, Cl. 241-46.060.
Dittman, William J.; and Ward, Luther S., to Georgia Tech Research Corporation. Waterproof seal assembly for electrical connector. 4,702,710, Cl. 439-271.000.
DiValentin, Eugene D.; and Healy, Henry S., to United Technologies Corporation. Torque control for a variable speed wind turbine. 4,703,189, Cl. 290-44.000.
Di Vita, Pietro; and Potenza, Marcello, to Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A. Semiconductor lasers. 4,703,488, Cl. 372-44.000.
Dix, James S.: *See*—
Tieszen, Dale O.; and Dix, James S., 4,703,088, Cl. 525-189.000.
Dr. Hans Heubach GmbH & Co. KG: *See*—
Gawol, Manfred; and Adrian, Gerhard, 4,702,116, Cl. 73-865.600.
Dr. von Ballmoos AG: *See*—
von Ballmoos, Fritz, 4,703,164, Cl. 235-384.000.
Dodson, Douglas A. Cooling system for personal computer. 4,702,154, Cl. 98-1.000.
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Dole, Douglas R.: *See*—
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Dombek, Bernard D., to Union Carbide Corporation. Process for producing alcohols. 4,703,064, Cl. 518-700.000.
Dominguez, Peter R. Modified arch support. 4,702,044, Cl. 52-86.000.
Donaldson Company, Inc.: *See*—
Schuler, Fredrick E., 4,702,269, Cl. 137-246.120.
Donat Flamand, Inc.: *See*—
Giguere, Jean-Paul, 4,702,050, Cl. 52-202.000.
Dosaj, Vishu D.; Oleson, John D.; and Bokerman, Gary N., to Dow Corning Corporation. Handling of by-product gases from a silicon furnace. 4,702,902, Cl. 423-350.000.
Dosapro Milton Roy: *See*—
Fontaine, Guy R.; Malizard, Max A.; and Demouron, Bernard R., 4,702,674, Cl. 417-44.000.
Dotsch, Horst: *See*—
Beckmann, Friedrich K.; Dotsch, Horst; and Hoppe, Wolfgang, 4,702,557, Cl. 350-330.000.
Doty, Edward N.: *See*—
Cabrera, Pedro P.; Berra, Humberto A.; and Doty, Edward N., 4,702,889, Cl. 422-103.000.
Douglas, Monte A., to Texas Instruments Incorporated. Trench etch process. 4,702,795, Cl. 156-643.000.
Dow Chemical Company, The: *See*—
Allada, Sambasiva R., 4,703,105, Cl. 528-483.000.
Dighton, Gaylon L.; and Lewis, John W., 4,702,009, Cl. 33-126.600.
Gregory, Thomas D.; and Hoffman, Ronald J., 4,702,974, Cl. 429-50.000.
Herrero, Maria P.; and Holtwick, Joseph B., 4,702,761, Cl. 71-87.000.
Klimpel, Richard R.; and Hansen, Robert D., 4,702,822, Cl. 209-166.000.
Murphy, Frank H., 4,703,123, Cl. 546-345.000.
Regelman, Dale F., 4,703,099, Cl. 528-54.000.
Smith, David A.; and Geiger, Herbert B., 4,702,471, Cl. 271-284.000.
Snyder, Kenneth L., Jr.; and Evani, Syamalarao, 4,702,854, Cl. 252-75.000.
Dow Corning Corporation: *See*—
Dosaj, Vishu D.; Oleson, John D.; and Bokerman, Gary N., 4,702,902, Cl. 423-350.000.
Dowbenko, Rostyslaw: *See*—
Singer, Debra L.; Dowbenko, Rostyslaw; and Simpson, Dennis A., 4,703,101, Cl. 528-87.000.
Dowell Schlumberger Incorporated: *See*—
Payne, Kathryn L., 4,702,848, Cl. 252-8.551.
Dowty Seals Limited: *See*—
Oseman, Gavin S., 4,702,482, Cl. 277-165.000.
Drackett Company, The: *See*—
Jones, David A., 4,702,368, Cl. 206-45.240.
Drensky, Stephen M.: *See*—
Happ, Lawrence R.; Stark, Gerald A.; and Drensky, Stephen M., 4,703,147, Cl. 219-10.55C.
Dresser Industries, Inc.: *See*—
Golwas, Robert F.; Pennison, Robert A.; and Eckman, Richard E., 4,702,650, Cl. 408-6.000.
Greenlee, Donald R.; and Lustig, Lee M., 4,702,313, Cl. 166-216.000.
Dretzka, Ellen E.; Quan, Zoe S.; and Schreiner, Philip A., to American Telephone and Telegraph Company AT&T Bell Laboratories. Data communication method and apparatus using multiple physical data links. 4,703,475, Cl. 370-60.000.
Dreyfus, Russell W.: *See*—
Beha, Johannes G.; Dreyfus, Russell W.; Kash, Jeffrey A.; and Rubloff, Gary W., 4,703,260, Cl. 324-158.00R.
DRS Infusion Systems, Inc.: *See*—
Luther, Ronald B.; Snyder, Daniel R.; and Whitehouse, Craig M., 4,702,735, Cl. 604-161.000.
DuBois, R. Clark. Sheet material feeder for copiers and other sheet processing apparatus. 4,702,466, Cl. 271-10.000.
Dubs, Robert A.: *See*—
Peinecke, Dale R.; Robak, Casimir B., Jr.; and Dubs, Robert A., 4,702,324, Cl. 173-39.000.
Duck, Gary S.; and Sinclair, William J. Reciprocating variable optical attenuator filter. 4,702,549, Cl. 350-96.150.
Dudley, Robert H.: *See*—
Areauz, Larry D.; and Dudley, Robert H., 4,702,768, Cl. 75-65.00R.
Duescher, Wayne O.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.
Dukes, John N.: *See*—
Baumgartner, Richard A.; Dukes, John N.; and Fisher, George A., 4,703,251, Cl. 324-57.00R.
Dumont, Andre : *See*—
Chiron, Guy; and Dumont, Andre , 4,703,266, Cl. 324-249.000.
Duncan, Gary L., to Mobil Oil Corporation. Polymer laminate possessing an intermediate water vapor transmission barrier layer. 4,702,954, Cl. 428-213.000.
Dunlap, Bill D., to KB Denver, Inc. Method in a snap dome switch keyboard assembly for reducing contact bounce time. 4,703,139, Cl. 200-76.000.
Du Pont de Nemours, E. I., and Company: *See*—
Craig, Alan R.; and Gorman, Eileen G., 4,703,018, Cl. 436-518.000.
El-Sayed, Lyla M.; and Taggi, Arthur J., 4,702,984, Cl. 430-115.000.
Falcoff, Allan F., 4,702,931, Cl. 427-10.000.
Jennings, Uel D., 4,702,875, Cl. 264-177.130.
Larson, James R., 4,702,985, Cl. 430-115.000.
Magoida, Ronald L.; Confalone, Pasquale N.; and Johnson, Paul R., 4,702,864, Cl. 260-402.500.
Duro-Test Corporation: *See*—
Walsh, Peter J., 4,703,220, Cl. 313-112.000.
Durr, Charles A.: *See*—
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., 4,702,819, Cl. 208-354.000.

Dursch, Harry W., to Boeing Company, The. CdS/$CuInSe_2$ solar cells with titanium foil substrate. 4,703,131, Cl. 136-258.000.

Dust, Matthias: *See—*
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.

Dynamic Hydraulic Systems, Inc.: *See—*
Rosman, Alan H., 4,702,076, Cl. 60-372.000.

Dynamit Nobel AG: *See—*
Hellriegel, Edmund, 4,702,040, Cl. 49-502.000.

Dynisco, Inc.: *See—*
Wareham, William, 4,702,113, Cl. 73-706.000.

Dzewaltowski, Victor F.; Halvorsen, James; and Check, John M., to Ex-Cell-O Corporation. Method of combining grinding and EDM operation for finishing fuel injector nozzle bodies. 4,703,142, Cl. 219-69.00M.

E. R. Squibb & Sons, Inc.: *See—*
Karanewsky, Donald S.; and Petrillo, Edward W., Jr., 4,703,043, Cl. 514-80.000.

Eachus, Vernon F.: *See—*
Kelley, Anthony D.; Finley, James W.; Eachus, Vernon F.; Lim, Richard A.; and Yano, Miles K., 4,702,439, Cl. 244-158.00A.

Eagle-Picher Industries, Inc.: *See—*
Higbie, Robert E.; and Beebe, James C., 4,702,287, Cl. 141-4.000.

Eastman Christensen Co.: *See—*
Kotlyar, Oleg, 4,703,461, Cl. 367-83.000.

Eastman Kodak Company: *See—*
Findlay, John B.; and Wu, Annie L., 4,703,002, Cl. 435-17.000.

Eaton Corporation: *See—*
Cote, William F., 4,702,127, Cl. 74-866.000.
Guerra, Michael, 4,703,183, Cl. 250-492.200.
Kalns, Ilmars, 4,702,125, Cl. 74-695.000.

Eberl, Karlheinz: *See—*
Hollweck, Walter; and Eberl, Karlheinz, 4,703,301, Cl. 337-367.000.

Ebert, Charles; Delcroix, Jean L.; Majchrzak, Roland; and Viertel, Lothar, to Gebr. Happich GmbH. Bracket for sun visor for automotive vehicles with means for excluding molding foam. 4,702,513, Cl. 296-97.00H.

Ebregt, Johan L.; and Maatman, Hendrik, to Akzo N.V. Variable-aperture process for the manufacture of filaments from aromatic polyamides. 4,702,876, Cl. 264-184.000.

Eccles, Richard M.: *See—*
Li, Allen S.; and Eccles, Richard M., 4,702,891, Cl. 422-140.000.

Eckman, Richard E.: *See—*
Golwas, Robert F.; Pennison, Robert A.; and Eckman, Richard E., 4,702,650, Cl. 408-6.000.

Economopoulos, Marios, to Centre de Recherche Metallurgiques-Centrum Voor Research in de Metallurgie. Electrolytic apparatus and a method of operating it. 4,702,812, Cl. 204-208.000.

Edwards, Douglas F., to J. B. Foote Foundry Co., The. Shift mechanism employing gears with built-in ramps. 4,702,119, Cl. 74-371.000.

Edwards, John R.; Popov, George D.; and Philbrick, John B., to LaPine Technology. Apparatus for loading and retracting magnetic head in a disk drive. 4,703,376, Cl. 360-105.000.

Edwards, Lawrence J., to Combustion Engineering, Inc. Self-orienting conduit probe. 4,703,264, Cl. 324-220.000.

Egami, Masaki, to NTN-Rulon Industries Co., Ltd. Resinous compositions having lubricity. 4,703,075, Cl. 524-269.000.

Eheim, Franz J., deceased: *See—*
Bohringer, Wilfried; and Eheim, Franz J., deceased, 4,702,680, Cl. 417-490.000.

Eheim, Helga R., heir: *See—*
Bohringer, Wilfried; and Eheim, Franz J., deceased, 4,702,680, Cl. 417-490.000.

Eidenschink, Rudolf: *See—*
Scheubie, Bernhard; Eidenschink, Rudolf; and Weber, Georg, 4,702,562, Cl. 350-350.00R.

Eigenstetter, Herbert; and Mengel, Peter, to Siemens Aktiengesellschaft. Arrangement for optical imaging of two subjects located in different object planes. 4,703,185, Cl. 250-548.000.

Einsle, Guenter; and Mayr, Ernst, to Siemens Aktiengesellschaft. Method and apparatus for regulating speed of a longitudinally moving fiber. 4,702,404, Cl. 226-7.000.

el.ge Apparecchiature Elettroniche Industriali S.r.l.: *See—*
Franzolini, Luciano, 4,703,391, Cl. 361-240.000.

Elastogran Maschinenbau GmbH: *See—*
Wallner, Josef, 4,702,890, Cl. 422-133.000.

Elbracht, Kurt, to Mannesmann AG. Testing the internal geometry of tubes and pipes. 4,702,010, Cl. 33-178.00F.

Electric Power Development Co., Ltd.: *See—*
Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.

Electric Power Research Institute, Inc.: *See—*
Borgialli, Ronald R., 4,702,888, Cl. 422-50.000.

Electro-Biology, Inc.: *See—*
Gardner, Arthur M. N.; and Fox, Roger H., 4,702,232, Cl. 128-64.000.

Electroplating Engineers of Japan, Limited: *See—*
Murata, Yasuto; Tezuka, Junichi; and Yamamoto, Kenji, 4,702,811, Cl. 204-206.000.

Elf France: *See—*
Trema, Daniel, 4,702,338, Cl. 180-219.000.

Eli Lilly and Company: *See—*
Lord, Gary E.; Metzler, Robert M.; and Wirth, David D., 4,703,118, Cl. 540-224.000.

Ellicott Machine Corporation: *See—*
McDowell, Alexander W. K., 4,702,023, Cl. 37-66.000.

Elliott, Franklin E.; and Kudishevich, Anatoly, to Capri Lighting. One piece lamp mounting for recessed light fixtures. 4,703,406, Cl. 362-365.000.

Elliott, James E., to Discovision Associates. Video disc read back scanner. 4,703,467, Cl. 369-44.000.

Elliott, Morris C., Sr. Long-haul vehicle streamline apparatus. 4,702,509, Cl. 296-1.00S.

Ellis, Cedric R.; Long, Peter G.; Marshman, Christopher A.; and Gillery, David J., to Ellis, Cedric R. Heating instrument for treating a deformed nail. 4,702,246, Cl. 128-303.100.

Elsasser, Heinz: *See—*
Kuhnemundt, Gerhard; and Elsasser, Heinz, 4,703,248, Cl. 323-300.000.

El-Sayed, Lyla M.; and Taggi, Arthur J., to Du Pont de Nemours, E. I., and Company. Polybutylene succinimide as adjuvant for electrostatic liquid developer. 4,702,984, Cl. 430-115.000.

Elscint Ltd.: *See—*
Beer, Steve, 4,703,276, Cl. 324-319.000.

Elstein, Rick A.; Faret, Svein; and Gazzo, John J., to Innovating Training Products, Inc. Sports technique and reaction training system. 4,702,475, Cl. 273-1.0GC.

Elston, Malcolm: *See—*
Jones, David W.; and Elston, Malcolm, 4,703,328, Cl. 343-704.000.

El-Toukhy, Ahmed: *See—*
Davies, Geoffrey; and El-Toukhy, Ahmed, 4,702,748, Cl. 44-56.000.

Ely, Glenn L., to Intersil, Inc. Non-restricted level shifter. 4,703,199, Cl. 307-264.000.

Emerson Electric Co.: *See—*
Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., 4,702,976, Cl. 429-181.000.

EMI Limited: *See—*
Hounsfield, Godfrey N.; and Williams, Anthony M., 4,702,667, Cl. 414-735.000.

Emoto, Kazuhiro: *See—*
Haino, Kozo; Emoto, Kazuhiro; and Itoh, Akira, 4,702,983, Cl. 430-75.000.

Endo, Hiroyuki: *See—*
Takagi, Yoshiaki; Katsui, Yoshihiro; Endo, Hiroyuki; and Ikenoue, Yutaka, 4,702,771, Cl. 75-241.000.

Endo, Masami: *See—*
Hirabayashi, Hideo; Endo, Masami; and Kokubo, Kakuro, 4,702,414, Cl. 239-4.000.

Endo, Shyusuke; Aoyama, Naofumi; Yabuuchi, Toshihiko; Sakuma, Toshiyuki; and Kinugawa, Kiyoshige, to Hitachi, Ltd. Liquid crystal display device. 4,702,560, Cl. 350-333.000.

Energy Conversion Devices, Inc.: *See—*
Ovshinsky, Stanford R.; and Madan, Arun, 4,703,336, Cl. 357-30.000.

Enertrols, Inc.: *See—*
Heideman, Robert J., 4,702,355, Cl. 188-285.000.

England, Michael J.: *See—*
Ingram, Brian; Margetts, Hugh G.; and England, Michael J., 4,702,352, Cl. 188-79.620.

Engle, Thomas H., to General Signal Corporation. Propulsion system for integral trains. 4,702,291, Cl. 105-35.000.

English Electric Valve Company Limited: *See—*
Menown, Hugh, 4,703,226, Cl. 313-595.000.

Engstrom, Ulf F. I.; Allroth, Sven E.; and Mustonen, Olavi M., to Hoganas AB. Sintered alloy. 4,702,772, Cl. 75-243.000.

Enichem Polimeri S.p.A.: *See—*
Ferraresi, Andrea; and Griselli, Pierluigi, 4,703,090, Cl. 525-246.000.

Enochs, R. Scott, to Tektronix, Inc. Method for attaching an optical fiber to a substrate to form an optical fiber package. 4,702,547, Cl. 350-96.200.

Enomoto, Akio: *See—*
Hattori, Isao; and Enomoto, Akio, 4,702,138, Cl. 83-785.000.

Enomoto, Hiromu; Yasuda, Yasushi; Tahara, Akinori; and Kumagai, Masao, to Fujitsu Limited. Two-stage gate circuit providing inverted and non-inverted outputs. 4,703,202, Cl. 307-443.000.

Enomoto, Yoshinori; Monma, Hideo; Ohta, Shunzo; and Sasaki, Takeshi, to Fujitsu Limited. Chip on chip type integrated circuit device. 4,703,483, Cl. 371-24.000.

Eotec Corporation: *See—*
Krohn, David A., 4,703,309, Cl. 340-347.00P.

Equipment Development Company, Inc.: *See—*
Swan, Leo, 4,702,223, Cl. 125-3.000.

Erickson, Norton J. Apparatus for lifting and end of a hitch. 4,702,489, Cl. 280-479.00A.

Eriez Manufacturing Company: *See—*
Selvaggi, Jerry A.; and Purcell, John R., 4,702,825, Cl. 209-224.000.

Erno Raumfahrttechnik GmbH: *See—*
Guenther, Hans-Juergen; Golbeck, Ortwin; and Nauck, Joachim, 4,702,440, Cl. 244-158.00R.

Esakoff, Gregory F.: *See—*
Cunningham, David W.; and Esakoff, Gregory F., 4,703,412, Cl. 364-140.000.

Escaravage, Gerard, to Aciers et Outillage Peugeot. Device for adjusting the position of a strap return element, of in particular a safety belt for a motor vehicle. 4,702,493, Cl. 280-808.000.

Escaravage, Gerard, to Aciers et Outillage Peugeot. Device for adjusting the position of a strap return element of a safety belt. 4,702,494, Cl. 280-808.000.

Esparza, Joe O., to Shell Oil Company. Reduced J-tube pull force. 4,702,647, Cl. 405-169.000.

ETA SA Fabriques d'Ebauches: *See—*
Studer, Bruno, 4,701,987, Cl. 29-25.350.

Etablissments Staubli-Verdol: *See—*
Palau, Joseph; and Bassi, Dario, 4,702,286, Cl. 139-455.000.

Etat Francais represente par le Deleuge General pour l'armement: *See—*
Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., 4,702,172, Cl. 102-521.000.

ETD Technology Inc.: *See—*
Garlough, Greg D.; and Heikkila, Kurt E., 4,702,793, Cl. 156-629.000.

Ettelman, David J.; and Floresta, John G., to Kollmorgen Technologies Corporation. Stepping motor harmonic suppression. 4,703,243, Cl. 318-696.000.

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Aboukrat, Simon; Catoir, Lucien; Guatelli, Jean-Luc; and Sobiepanek, Janusz, 4,703,212, Cl. 310-218.000.

Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, to BASF Aktiengesellschaft. Optical recording medium. 4,702,945, Cl. 428-1.000.

Etzkorn, Heinz-Werner: *See—*
Heide, Helmut; Etzkorn, Heinz-Werner; Poeschel, Eva; and Steininger, Helmut, 4,702,930, Cl. 427-2.000.

Evana Tool & Engineering Inc.: *See—*
Niehaus, Gerald; and Bivens, Ernest, 4,702,660, Cl. 414-95.000.

Evani, Syamalarao: *See—*
Snyder, Kenneth L., Jr.; and Evani, Syamalarao, 4,702,854, Cl. 252-75.000.

Everhart, Ann H.: *See—*
Kurkjian, Andrew L.; Chang, Shu-Kong; and Everhart, Ann H., 4,703,460, Cl. 367-31.000.

Ewald, Hans, to Continental Gummi-Werke Aktiengesellschaft. Method and apparatus for mounting pneumatic vehicle tires. 4,702,295, Cl. 157-1.000.

Ex-Cell-O Corporation: *See—*
Dzewaltowski, Victor F.; Halvorsen, James; and Check, John M., 4,703,142, Cl. 219-69.00M.
Lisiecki, Robert E., 4,702,407, Cl. 206-624.000.
Richardson, Robert G., 4,702,061, Cl. 53-381.00R.

Excelermatic Inc.: *See—*
Kraus, Charles E., 4,702,118, Cl. 74-200.000.

Exner, Franz: *See—*
Vatter, Waldemar; and Exner, Franz, 4,702,330, Cl. 180-6.200.

Exxon Production Research Company: *See—*
Bower, Frank M., 4,703,459, Cl. 367-25.000.
Guile, Peter J. D., 4,702,636, Cl. 403-24.000.

Exxon Research and Engineering Company: *See—*
Bock, Jan; Valint, Paul L.; and Pace, Salvatore J., 4,702,319, Cl. 166-275.000.
Gardner, Irwin J.; Fusco, James V.; Newman, Neil F.; Kowalski, Ronald C.; Davis, William M.; and Baldwin, Francis P., 4,703,091, Cl. 525-332.300.
Gutierrez, Antonio; Brois, Stanley J.; Ryer, Jack; and Deen, Harold E., 4,702,850, Cl. 252-48.200.
Ryan, Douglas G.; and Ackerman, Steven, 4,702,817, Cl. 208-28.000.

Eye Pro, Inc.: *See—*
Simon, James A., 4,701,962, Cl. 2-15.000.

Fachin, Gino: *See—*
Marchesi, Sergio; and Fachin, Gino, 4,702,282, Cl. 138-176.000.

Fairprene Industrial Products Company, Inc.: *See—*
Pagliaro, Ernest H., 4,702,376, Cl. 206-524.800.

Falchi, Fiorino, to General Electric Company. Snap-action bayonet-type fastening device for control and/or signalling units. 4,702,711, Cl. 439-546.000.

Falcoff, Allan F., to Du Pont de Nemours, E. I., and Company. Paint spray machine having wet film thickness measurement and feedback control. 4,702,931, Cl. 427-10.000.

Falkenstrom, Lee J.: *See—*
Rolfe, Robert M.; and Falkenstrom, Lee J., 4,703,484, Cl. 371-25.000.

Fang, Pao-Hsien, to Birch, Richard J., a part interest. Low vacuum silicon thin film solar cell and method of production. 4,702,965, Cl. 428-457.000.

Fanuc Ltd.: *See—*
Kinoshita, Mitsuo, 4,703,146, Cl. 219-69.00W.
Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Ito, Susumu, 4,702,665, Cl. 414-730.000.
Sakamoto, Keiji; and Kobayashi, Toshio, 4,703,246, Cl. 318-809.000.
Yamazaki, Etsuo; and Matsuura, Hitoshi, 4,703,239, Cl. 318-578.000.

Fanuc Ltd: *See—*
Fujioka, Yoshiki; and Tokuoka, Hiroshi, 4,703,262, Cl. 324-208.000.
Kishi, Hajimu; Seki, Masaki; Takegahara, Takashi; and Onishi, Yasushi, 4,703,415, Cl. 364-170.000.
Kishi, Hajimu; Matsumura, Teruyuki; and Tanaka, Kunio, 4,703,441, Cl. 364-526.000.
Sakamoto, Keiji; and Kobayashi, Toshio, 4,703,245, Cl. 318-809.000.

Faret, Svein: *See—*
Elstein, Rick A.; Faret, Svein; and Gazzo, John J., 4,702,475, Cl. 273-1.0GC.

Farina, Carlo: *See—*
Pinza, Mario; Farina, Carlo; Banfi, Silvano; and Pfeiffer, Ugo, 4,703,054, Cl. 514-386.000.

Farnum, Bruce W., to Certified Technologies Corporation. Flame retardant materials. 4,702,861, Cl. 252-601.000.

Farrar, David: *See—*
Flesher, Peter; Farrar, David; Hawe, Malcolm; and Langley, John, 4,702,844, Cl. 210-733.000.

Farrell, Christopher J.; and Tsai, Boh C., to American Can Company. Oxygen scavenger. 4,702,966, Cl. 428-500.000.

Fay, Gary; Mansmann, Jeffrey G.; and Wellnitz, Keith M., to Motorola, Inc. Integrated circuit power timer. 4,703,390, Cl. 361-101.000.

Federal-Mogul Corporation: *See—*
Fontana, Mario, 4,702,624, Cl. 384-294.000.

Fegan, Richard M.: *See—*
Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., 4,701,969, Cl. 15-79.00R.

Fehn, John H.: *See—*
Kaufman, Leon; Carlson, Joseph W.; Arakawa, Mitsuaki; McCarten, Barry M.; and Fehn, John H., 4,703,274, Cl. 324-318.000.

Ferguson, Brian D.; and Jackson, Phillip B., to Aqua-Edge Industries Australia Pty. Ltd. Edging assembly. 4,702,034, Cl. 47-33.000.

Ferguson, Frank T., to Control Technology, Inc. Reserve power source with power failure detection apparatus. 4,703,191, Cl. 307-64.000.

Ferguson, Frank T., to Control Technology, Inc. Alternating current power source with improved phase adjusting capability. 4,703,192, Cl. 307-64.000.

Ferranti, plc: *See—*
Grant, George S., 4,702,602, Cl. 356-350.000.
Ross, Iain E., 4,703,489, Cl. 372-64.000.

Ferraresi, Andrea; and Griselli, Pierluigi, to Enichem Polimeri S.p.A. Method for the preparation of graft copolymers by emulsion copolymerization. 4,703,090, Cl. 525-246.000.

Ferreira, Marc; McCormick, John; Bernard, Raymond; Butryn, Joseph; and Clifford, Ronald, to Author's Family Trust. Device for measuring and indicating changes in resistance of a living body. 4,702,259, Cl. 128-734.000.

Ferri, Vincent J. Product coupon container attachable to shopping cart. 4,702,402, Cl. 224-277.000.

Ferry Cap & Set Screw Company, The: *See—*
MacGuire, Andrew E., 4,702,272, Cl. 137-480.000.

Fiberdynamics, Inc.: *See—*
Anderson, John C.; Davies, Morris J.; and Lamb, Archie C., 4,703,174, Cl. 250-227.000.

Fields, Roy. Spare battery holder for a battery-operated device. 4,702,975, Cl. 429-100.000.

Filtromatic Corp.: *See—*
Wender, Harry, 4,702,383, Cl. 215-232.000.

Finch, Maurice, to Simon-Barron Limited; and Henley Burrowes & Co. Ltd. System for producing fuel pellets. 4,702,746, Cl. 44-14.000.

Findlay, John B.; and Wu, Annie L., to Eastman Kodak Company. Method for preparing coating compositions containing an immunologically reactive species and elements containing same. 4,703,002, Cl. 435-17.000.

Findlay, Robert H.: *See—*
Allen, Kenneth C., Jr.; and Findlay, Robert H., 4,702,273, Cl. 137-487.500.

Finger, Hansjorg, to H. Finger, Firma. Compass-watch case. 4,702,612, Cl. 368-10.000.

Finkel, Henry; and Thomas, Allan. Sanitary, disposable baby change kit. 4,702,378, Cl. 206-581.000.

Finley, James W.: *See—*
Kelley, Anthony D.; Finley, James W.; Eachus, Vernon F.; Lim, Richard A.; and Yano, Miles K., 4,702,439, Cl. 244-158.00A.

Fischer, Edgar; and Schlingmann, Merten, to Hoechst Aktiengesellschaft. Process for isolating microbial polysaccharides from their fatty amine adducts. 4,703,117, Cl. 536-114.000.

Fischer, Wolfgang; and Krenn, Karl-Dieter, to Merck Patent Gesellschaft mit beschrankter Haftung. Karl-Fischer reagent and process for the determination of water. 4,703,014, Cl. 436-42.000.

Fisher, Alan D.: *See—*
Hunter, Victor L.; and Fisher, Alan D., 4,702,064, Cl. 56-312.000.

Fisher, George A.: *See—*
Baumgartner, Richard A.; Dukes, John N.; and Fisher, George A., 4,703,251, Cl. 324-57.00R.

Fisher Scientific Group, Inc.: *See—*
Spani, Wayne M., 4,703,314, Cl. 340-619.000.

Fisons plc: *See—*
Corbett, John S., 4,702,400, Cl. 222-402.200.

Fitelson, Michael M.; Wanuga, Stephen; and Williams, Jack B., to General Electric Company. Monolithically integrated electro-optical multiplexer/demultiplexer. 4,703,471, Cl. 370-1.000.

Fittler, Zsuzsa: *See—*
Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.

Flanagan, Peter F.: *See—*
Howarth, Thomas R.; Flanagan, Peter F.; Harrold, William J.; and Rodberg, Kenneth, 4,703,464, Cl. 367-156.000.
Flanigan, Sean: *See—*
Sampson, Robert; and Flanigan, Sean, 4,702,049, Cl. 52-200.000.
Flannaghan, Barry A., to Independent Broadcasting Authority. Apparatus for processing a television signal including a movement detector. 4,703,358, Cl. 358-167.000.
Fleck, Karl: *See—*
Konig, Gerhard; Fleck, Karl; Kess, Herbert; and Weigand, Artur, 4,701,974, Cl. 15-323.000.
Fleischer, Kenneth H., to International Rectifier Corporation. Phase-controlled power switching circuit. 4,703,197, Cl. 307-646.000.
Fleming, Bruce A.: *See—*
Unmuth, Eugene E.; and Fleming, Bruce A., 4,703,031, Cl. 502-339.000.
Flesher, Peter; Farrar, David; Hawe, Malcolm; and Langley, John, to Allied Colloids Limited. Flocculants and their use. 4,702,844, Cl. 210-733.000.
Fletcher, James D., to RCA Corporation. Latch for printed circuit board. 4,703,396, Cl. 361-419.000.
Flinchbaugh, Bruce E., to Texas Instruments Incorporated. Method and apparatus for reviewing and modifying horizons of a three-dimensional seismic volume. 4,703,426, Cl. 364-421.000.
Floresta, John G.: *See—*
Ettelman, David J.; and Floresta, John G., 4,703,243, Cl. 318-696.000.
FMC Corporation: *See—*
Lambrecht, Emiel Y.; and Van Der Gucht, William, 4,702,731, Cl. 493-196.000.
Maravetz, Lester L., 4,702,763, Cl. 71-90.000.
Fong, Dodd W., to Nalco Chemical Company. Process of making N-(2-hydroxy-3-sulfopropyl amide containing polymers. 4,703,092, Cl. 525-351.000.
Fontaine, Guy R.; Malizard, Max A.; and Demouron, Bernard R., to Dosapro Milton Roy. Method of accurately setting the flow rate of a variable-flow metering pump, and a metering pump employing the method. 4,702,674, Cl. 417-44.000.
Fontana, Mario, to Federal-Mogul Corporation. Flanged half bearing. 4,702,624, Cl. 384-294.000.
Fontana, Robert M.: *See—*
Bozinovich, Matthew J.; and Fontana, Robert M., 4,702,389, Cl. 220-306.000.
Ford Aerospace & Communications Corporation: *See—*
Motooka, Wesley D., 4,703,179, Cl. 250-334.000.
Ford, Curtis A., to Autotec International, Inc. Methods of and apparatus for testing internal combustion engines by monitoring the cooling systems thereof. 4,702,620, Cl. 374-145.000.
Ford Motor Company: *See—*
Porter, Frederick J.; and Pidsosny, Richard A., 4,703,198, Cl. 307-473.000.
Forestier, Serge: *See—*
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,702,906, Cl. 424-70.000.
Fortel Corporation: *See—*
Bond, Raymond G., 4,703,498, Cl. 379-70.000.
Foschini, Gerard J.; and Vannucci, Giovanni, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Spread spectrum code-division-multiple-access (SS-CDMA) lightwave communication system. 4,703,474, Cl. 370-18.000.
Fossas, Arturo; and Ruiz, Orlando. Distributed privacy oriented telephone extension system. 4,703,499, Cl. 379-194.000.
Fossi, Mario: *See—*
Manservisi, Renato; and Fossi, Mario, 4,702,730, Cl. 493-56.000.
Fournier, Joseph T., Jr.; and Swarts, Richard E., to United Technologies Corporation. Phase modulator for fiber-optic sensors. 4,703,287, Cl. 332-7.510.
Fowler, David P., to Frito-Lay, Inc. Process for producing two-component dough products. 4,702,926, Cl. 426-283.000.
Fox, Roger H.: *See—*
Gardner, Arthur M. N.; and Fox, Roger H., 4,702,232, Cl. 128-64.000.
Fraioli, Joseph. Gas-fired infrared heater. 4,702,693, Cl. 431-348.000.
Frame, John M.: *See—*
Ratzlaff, Marc H.; Frame, John M.; and Grant, Barrie D., 4,703,217, Cl. 310-338.000.
Franceschini, Jacqueline; Gardaix-Luthereau, Renee; and Margarit, Josette, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. Benzamides and therapeutic use thereof. 4,703,055, Cl. 514-400.000.
Francus, Tova: *See—*
Becker, Carl G.; Francus, Tova; and Siskind, Gregory W., 4,702,907, Cl. 424-88.000.
Frank, Arthur M., to Grumman Aerospace Corp. Collector for liquid droplet radiator. 4,702,309, Cl. 165-104.310.
Frank, Laszlo : *See—*
Hideg, Kalman; Hankovsky, Olga H.; Frank, Laszlo ; Bodi, Ilona; and Csak, Jozsef, 4,703,056, Cl. 514-414.000.
Franklin, Carl M.: *See—*
Oswald, Norman D.; Mankey, Harry S.; Franklin, Carl M.; Wilhelm, James M.; and Osborn, Ronnie M., 4,702,843, Cl. 280-707.000.
Franklin Electric Co., Inc.: *See—*
Miller, Thomas A., 4,703,387, Cl. 361-79.000.
Franklin, William L.: *See—*
Weiland, Richard H.; and Franklin, William L., 4,702,442, Cl. 244-216.000.
Franzolini, Luciano, to el.ge Apparecchiature Elettroniche Industriali S.r.l. Tachymetric simulation method processing signals from an inductive position transducer and circuit for carrying out said method. 4,703,391, Cl. 361-240.000.
Frappe, Gerard; and Ortalli, Patrice, to Thomson-CSF. Electric supply. 4,703,250, Cl. 323-317.000.
Freeman, Robert R.: *See—*
Brabandt, Earl; and Freeman, Robert R., 4,702,115, Cl. 73-864.850.
Freidinger, Roger; Nutt, Ruth F.; Lyle, Terry A.; and Saperstein, Richard, to Merck & Co., Inc. Novel cyclic tetrapeptide. 4,703,034, Cl. 514-11.000.
Fremont, Michael J., to Hewlett-Packard Company. Method and apparatus for fault recovery within a computing system. 4,703,481, Cl. 371-12.000.
Frens, Gerrit: *See—*
Heuts, Jacobus J. F. G.; and Frens, Gerrit, 4,702,978, Cl. 429-218.000.
Fresenius AG: *See—*
Polaschegg, Hans-Dietrich; and Mathieu, Bernd, 4,702,829, Cl. 210-195.200.
Frey, Harry. Door seal packing, especially for doors with or without thresholds. 4,702,038, Cl. 49-478.000.
Fricker, Siegfried. Anchor for concreting into heavy loads. 4,702,045, Cl. 52-125.400.
Fried. Krupp Gesellschaft mit Beschrankter Haftung: *See—*
Gockel, Karl-Heinz; and Mostofizadeh-Ghalamfarsa, Chapar, 4,702,085, Cl. 62-101.000.
Friesen, Dwayne T.: *See—*
Babcock, Walter C.; and Friesen, Dwayne T., 4,702,838, Cl. 210-638.000.
Frihart, Charles R.: *See—*
Locko, George A.; and Frihart, Charles R., 4,703,070, Cl. 523-102.000.
Frischmann, Albert; Rieger, Johannes; Mermi, Kurt; Kistner, Herbert; and Zimmermann, E. Harald, to Upat GmbH & Co. Spreading anchor. 4,702,654, Cl. 411-31.000.
Frito-Lay, Inc.: *See—*
Fowler, David P., 4,702,926, Cl. 426-283.000.
Fritz, Ernst, to Klockner CRA Technologie GmbH. Water-cooled lance for blowing oxidizing gas onto a metal melt. 4,702,462, Cl. 266-225.000.
Fromknecht, Thomas G.: *See—*
Mancuso, Jon R.; Fromknecht, Thomas G.; and White, Robert E., 4,702,359, Cl. 192-56.00R.
Fruntzek, Peter, to Mannesmann Demag Kunststofftechnik. Arrangement for fitting a mold tool in an injection molding machine. 4,702,685, Cl. 425-182.000.
Fry, John J.; Bastijanic, Edward; and Robertson, John W., Jr., to Babcock & Wilcox Company, The. Power supply for totem pole power switches. 4,703,407, Cl. 363-16.000.
Frye, Robert C.; and Tai, King L., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Interconnection lines for wafer-scale-integrated assemblies. 4,703,288, Cl. 333-1.000.
Frymaster Corporation, The: *See—*
Wenzel, Robert J., 4,702,827, Cl. 210-117.000.
Fuchs, Francis J., Jr. Apparatus and process for providing tubing with at least one internal spiral groove or fin. 4,702,096, Cl. 72-68.000.
Fuji Electric Company, Ltd.: *See—*
Sano, Yasukazu, 4,702,550, Cl. 350-96.160.
Fuji Kiko Company, Limited: *See—*
Narue, Atsushi; Saitoh, Shigeru; and Maruyama, Tomoyuki, 4,702,722, Cl. 464-93.000.
Fuji Kogyo Co., Ltd.: *See—*
Ohmura, Ryuichi, 4,702,032, Cl. 43-22.000.
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Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, 4,702,927, Cl. 426-467.000.
Fuji Photo Film Co., Ltd.: *See—*
Katou, Yoshiaki; Ueoka, Joe; and Yoshida, Satoshi, 4,703,383, Cl. 360-126.000.
Oosaka, Shigenori, 4,703,373, Cl. 360-97.000.
Yasunaga, Tadashi; Yanai, Akio; and Shirahata, Ryuji, 4,702,938, Cl. 427-132.000.
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Sugiyama, Norihide; Funato, Katsuro; Nagase, Hiroshi; Yamamoto, Seiichi; and Miyamori, Shigeo, 4,702,989, Cl. 430-137.000.
Fujikura Ltd.: *See—*
Tanaka, Masao; Watanabe, Okosu; and Inada, Koichi, 4,702,548, Cl. 350-96.150.
Fujikura, Takashi: *See—*
Imai, Kazuo; Niigata, Kunihiro; Fujikura, Takashi; Hashimoto, Shinichi; and Takenaka, Toichi, 4,703,063, Cl. 514-603.000.
Fujimoto, Manabu, to Shionogi & Co., Ltd. Tetrahedral codon stereotable. 4,702,704, Cl. 434-295.000.
Fujioka, Yoshiki; and Tokuoka, Hiroshi, to Fanuc Ltd. Mounting structure for spindle orientation magnetic sensor system. 4,703,262, Cl. 324-208.000.

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Ueda, Ikuo; Kobayashi, Masakazu; and Kitaguchi, Tadashi, 4,703,046, Cl. 514-202.000.
Fujita, Takashi: *See*—
Matsuura, Mitsuyuki; and Fujita, Takashi, 4,703,026, Cl. 502-119.000.
Fujitsu Limited: *See*—
Arakawa, Hideki, 4,703,196, Cl. 307-246.000.
Arakawa, Hideki, 4,703,456, Cl. 365-185.000.
Enomoto, Hiromu; Yasuda, Yasushi; Tahara, Akinori; and Kumagai, Masao, 4,703,202, Cl. 307-443.000.
Enomoto, Yoshinori; Monma, Hideo; Ohta, Shunzo; and Sasaki, Takeshi, 4,703,483, Cl. 371-24.000.
Hino, Youzi; and Ogawa, Hironobu, 4,703,302, Cl. 338-293.000.
Yamamoto, Tsuyoshi; Okada, Nobuhide; and Kawamura, Yasuo, 4,703,393, Cl. 361-405.000.
Fujiwara, Shigemi: *See*—
Kageyama, Hiroshi; Koyama, Katsuhide; and Fujiwara, Shigemi, 4,703,178, Cl. 250-327.200.
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Fukuda, Shinichiro, to Shaken Co., Ltd. Character image data compression system. 4,703,516, Cl. 382-56.000.
Fukuda, Tadaji: *See*—
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,702,981, Cl. 430-69.000.
Fukuda, Tamotsu; Shigeta, Shiro; Okuya, Hiroaki; Kuroiwa, Yasuyuki; and Sudo, Tadashi, to Mitsui Toatsu Chemicals, Inc. Common antigen (PSC-A) to *Pseudomonas aeruginosa* which acts as an agent for pretecting *Pseudomonas aeruginosa* infection. 4,702,910, Cl. 424-92.000.
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Fukumoto, Hiroshi; Ohnishi, Toshikazu; and Arahara, Kohzoh, to Canon Kabushiki Kaisha. Process for producing toner for developing electrostatic images. 4,702,988, Cl. 430-137.000.
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Fukushima, Naoto: *See*—
Yamaguchi, Kirotsugu; Fukushima, Naoto; Akatsu, Yousuke; and Hano, Sunao, 4,702,490, Cl. 280-707.000.
Fukuyama, Munekatsu: *See*—
Imakoshi, Shigeyoshi; Suyama, Hideo; Soda, Yutaka; Fukuyama, Munekatsu; and Iida, Yasuhiro, 4,703,378, Cl. 360-113.000.
Fukuyama, Toshihiko: *See*—
Maeda, Kazuo; Tokumasu, Noboru; and Fukuyama, Toshihiko, 4,702,936, Cl. 427-54.100.
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Sugiyama, Norihide; Funato, Katsuro; Nagase, Hiroshi; Yamamoto, Seiichi; and Miyamori, Shigeo, 4,702,989, Cl. 430-137.000.
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Sagami, Yosuke; Yamamoto, Akira; Watanabe, Shoji; Isobe, Tomohisa; and Funato, Susumu, 4,703,338, Cl. 357-72.000.
Furukawa Electric Co., Ltd.: *See*—
Uematsu, Tadayuki, 4,703,134, Cl. 174-106.0SC.
Fusco, James V.: *See*—
Gardner, Irwin J.; Fusco, James V.; Newman, Neil F.; Kowalski, Ronald C.; Davis, William M.; and Baldwin, Francis P., 4,703,091, Cl. 525-332.300.
Fusion Systems Corporation: *See*—
Wood, Charles H.; and Stowe, Richard W., 4,703,173, Cl. 250-227.000.
Futaba Denshi Kogyo Kabushiki Kaisha: *See*—
Suzuki, Nobuhiro, 4,703,241, Cl. 318-599.000.
Futami, Takashi: *See*—
Ichihara, Takeo; Watanabe, Shuichi; Futami, Takashi; and Oda, Nobutaka, 4,703,401, Cl. 362-80.000.
Fux, Kamil; and Gresa, Ludwig. Process for removing solids from a filtering device for the separation of liquids and solids. 4,702,847, Cl. 210-798.000.
Fux, Vladimir S.: *See*—
Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.
G-C Dental Industrial Corp.: *See*—
Sato, Atsushige; Miura, Ishi; Kumei, Yasuhiro; Okuno, Osamu; Nakano, Tsuyoshi; and Yoshida, Bunsaku, 4,702,765, Cl. 75-0.50B.
G & H Technology, Inc.: *See*—
Hager, Jeffrey J., 4,702,543, Cl. 439-271.000.
GA Technologies Inc.: *See*—
West, William P., 4,703,228, Cl. 315-149.000.
Gabriel, Klaus-Dieter: *See*—
Brudereck, Ulrich; and Gabriel, Klaus-Dieter, 4,702,175, Cl. 105-154.000.
Gaia, Aldino J., to Cooper Industries, Inc. Time lag electrical fuse. 4,703,300, Cl. 337-164.000.
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Ballun, John V.; and Gain, Lorand H., Jr., 4,702,275, Cl. 137-556.000.
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Ovil, Yoel; and Levy, Morris, 4,702,250, Cl. 128-334.00R.
Gallant, W. Keith, to Honeywell Inc. Firing train function indicator. 4,702,169, Cl. 102-401.000.
Gallup, Michael G.; and McLaughlin, Kevin L., to Motorola, Inc. BICMOS logic having three state output. 4,703,203, Cl. 307-446.000.
Gambro Engstrom AB: *See*—
Broddner, Sven M.; Bromster, Leif; Lundell, Ulf; and Pilenvik, Goran S., 4,702,242, Cl. 128-205.130.
Gannaway, Jane P.: *See*—
Prunesti, James; Bell, William D.; Gannaway, Jane P.; O'Boyle, Dolores; and Tedeschi, Anthony, 4,701,964, Cl. 2-406.000.
Gano, John C.; Schwendemann, Kenneth L.; Noack, Timothy J.; and Godfrey, Craig W., to Otis Engineering Corporation. Method and system for attaching and removing equipment from a wellhead. 4,702,320, Cl. 166-343.000.
Garbar, Henry J.; and Garbar, Joan H. Device for making cream. 4,702,608, Cl. 366-146.000.
Garbar, Joan H.: *See*—
Garbar, Henry J.; and Garbar, Joan H., 4,702,608, Cl. 366-146.000.
Garcia de Leon, Jose L., to Vitro-Tec Fideicomiso. Method for strengthening glass articles through electrostatic ionic interchange. 4,702,760, Cl. 65-30.140.
Gardaix-Luthereau, Renee: *See*—
Franceschini, Jacqueline; Gardaix-Luthereau, Renee; and Margarit, Josette, 4,703,055, Cl. 514-400.000.
Gardner, Arthur M. N.; and Fox, Roger H., to Electro-Biology, Inc. Method and apparatus for inducing venous-return flow. 4,702,232, Cl. 128-64.000.
Gardner, Irwin J.; Fusco, James V.; Newman, Neil F.; Kowalski, Ronald C.; Davis, William M.; and Baldwin, Francis P., to Exxon Research & Engineering Co. Halogenated butyl rubber. 4,703,091, Cl. 525-332.300.
Gardner, Keith: *See*—
Pettigrew, Robert M.; Gardner, Keith; and Longman, Robert J., 4,703,469, Cl. 369-101.000.
Gargouil, Yves M.: *See*—
Marchand, Bernard; and Gargouil, Yves M., 4,703,057, Cl. 514-432.000.
Garlough, Greg D.; and Heikkila, Kurt E., to ETD Technology Inc. Method for manufacturing a laminated layered printed wiring board using a sulfuroxy acid and an oxiding treatment of the metallic wiring patterns to insure the integrity of the laminate product. 4,702,793, Cl. 156-629.000.
Garrett Corporation, The: *See*—
Bunkoczy, Bela; Wendorff, James A.; and Battin, Walt W., 4,702,969, Cl. 428-635.000.
Garthoff, Bernward; Kazda, Stanislav; and Knorr, Andreas, to Bayer Aktiengesellschaft. Combination of dihydropyridines with angiotensin converting enzymes-inhibitors. 4,703,038, Cl. 514-19.000.
Garthoff, Bernward: *See*—
Ingendoh, Axel; Meyer, Horst; and Garthoff, Bernward, 4,703,125, Cl. 548-126.000.
Gassler, Herbert. Device to operate a piezoelectric ultrasonic transducer. 4,703,213, Cl. 310-316.000.
Gaston County Dyeing Machine Company: *See*—
Turner, James K., 4,702,092, Cl. 68-53.000.
Gatan Inc.: *See*—
Swann, Peter R.; and Kraus, Bernd, 4,703,181, Cl. 250-442.100.
Gaulding, William R.; Smith, William D.; and Marsh, Nicholas C., to Atchison, Topeka and Santa Fe Railway Company, The. Captive cross member system for restraining movement of lading. 4,702,653, Cl. 410-144.000.
Gauler, Kurt, to Incoe Exp. Inc. Nozzle for a synthetic plastic injection molding machine. 4,702,686, Cl. 425-190.000.
Gawol, Manfred; and Adrian, Gerhard, to Dr. Hans Heubach GmbH & Co. KG. Permanently non-dusting pigment and dye preparations, method for producing them, and measuring device therefor. 4,702,116, Cl. 73-865.600.
Gazzo, John J.: *See*—
Elstein, Rick A.; Faret, Svein; and Gazzo, John J., 4,702,475, Cl. 273-1.0GC.
Gebald, Gregor: *See*—
Gilljam, Hans N.; Chardon, Manfred; Gebald, Gregor; and Illig, Heinz-Peter, 4,702,433, Cl. 242-118.100.
Gebr. Happich GmbH: *See*—
Ebert, Charles; Delcroix, Jean L.; Majchrzak, Roland; and Viertel, Lothar, 4,702,513, Cl. 296-97.00H.
Gebruder Heller GmbH, Werkzeugfabrik: *See*—
Kleine, Werner, 4,702,651, Cl. 408-226.000.
Geddie, John D.: *See*—
Van Duyn, Paul D.; and Geddie, John D., 4,703,399, Cl. 362-66.000.
Geer, Julia S., to Shell Western E&P Inc. Turbine cooling waxy oil. 4,702,758, Cl. 62-532.000.
Gehring, Fritz, to Lindauer Dornier Gesellschaft mbH. Method and apparatus for inserting weft threads into the loom shed of shuttleless looms. 4,702,284, Cl. 139-446.000.
Geiger, David J.; Lee, Sunny; and Busch, Eric, to ITT Corporation. Reticle assembly, system, and method for using the same. 4,702,592, Cl. 355-53.000.
Geiger, Herbert B.: *See*—
Smith, David A.; and Geiger, Herbert B., 4,702,471, Cl. 271-284.000.
Geisen, Harry: *See*—
Schrader, Jennifer R.; and Geisen, Harry, 4,702,523, Cl. 297-485.000.
Genco, Robert J.: *See*—
Terranova, Victor P.; Wikesjo, Ulf M. E.; Genco, Robert J.; Hic, Susanne; and Lyall, Raymond M., 4,702,734, Cl. 604-54.000.

Gencorp Inc.: *See—*
Bocchinfuso, Peter, 4,702,039, Cl. 49-490.000.

General Communications, Inc.: *See—*
Haugen, Per; Haugen, Harold M.; and De Jong, Ingolf J. C., 4,702,046, Cl. 52-144.000.

General Electric Company: *See—*
Brinkman, Earl H.; and Morrison, Bruce L., 4,702,671, Cl. 415-134.000.
Falchi, Fiorino, 4,702,711, Cl. 439-546.000.
Fitelson, Michael M.; Wanuga, Stephen; and Williams, Jack B., 4,703,471, Cl. 370-1.000.
Griffing, Bruce F.; and West, Paul R., 4,702,996, Cl. 430-325.000.
Gullberg, Grant T.; and Crawford, Carl R., 4,703,424, Cl. 364-414.000.
Hansen, Kurt L.; and VanDenburgh, Ronald J., 4,702,673, Cl. 416-215.000.
Komanduri, Ranga, 4,702,649, Cl. 407-119.000.
Meccariello, Thomas V.; and Relihan, Gary F., 4,703,496, Cl. 378-99.000.
Morris, Robert A.; and Rajotte, Paul T., 4,702,002, Cl. 29-837.00X.
Poling, Ronald W., 4,703,140, Cl. 200-83.00P.
Robertson, Brian T., 4,703,392, Cl. 361-402.000.
Scott, Graham A., 4,703,389, Cl. 361-93.000.

General Instrument Corp.: *See—*
Stevens, Gerald S., Jr., 4,703,331, Cl. 346-140.00R.

General Mills, Inc.: *See—*
Mikulski, Barry S.; McDonald, Duane L.; and Deffenbaugh, Lynn B., 4,703,148, Cl. 219-10.55E.

General Motors Corporation: *See—*
Rice, Hal H., 4,702,304, Cl. 164-529.000.
Van Duyn, Paul D.; and Geddie, John D., 4,703,399, Cl. 362-66.000.

General Signal Corporation: *See—*
Engle, Thomas H., 4,702,291, Cl. 105-35.000.

Genest, Leonard J. Security system. 4,703,163, Cl. 235-382.000.

Gennery, Donald B., to United States of America, National Aeronautics and Space Administration. Neighborhood comparison operator. 4,703,513, Cl. 382-27.000.

Georg Fischer Aktiengesellschaft: *See—*
Mueller, Wilhelm; Overath, Friedhelm; and Weyer, Michael, 4,702,498, Cl. 285-55.000.

George Koch Sons, Inc.: *See—*
Tredwell, Gilman; Kraft, Kenneth N.; and Ampon, Felix A., 4,702,174, Cl. 104-172.200.

Georgia Tech Research Corporation: *See—*
Dittman, William J.; and Ward, Luther S., 4,702,710, Cl. 439-271.000.

Geria, Navin, to Warner-Lambert Company. Analgesic stick compositions. 4,702,916, Cl. 424-400.000.

Gersbach, Klaus: *See—*
Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., 4,702,172, Cl. 102-521.000.

Gerson, Philips M., to Texas Instruments Incorporated. Thermostat with ceramic mounting pins of resistive material. 4,703,298, Cl. 337-102.000.

Gerteis, Hans, to Heinkel Industriezentrifugen GmbH & Co. Filter for squeezing out suspensions. 4,702,831, Cl. 210-236.000.

Gewerkschaft Eisenhutte Westfalia GmbH: *See—*
Kussel, Willy; Dettmers, Michael; and Weirich, Walter, 4,702,148, Cl. 91-527.000.

Geyer, Otto-Christian: *See—*
Wingler, Frank; and Geyer, Otto-Christian, 4,703,097, Cl. 526-279.000.

Ghorbani, Ali; and Walker, Gary M., to Rockwell International Corporation. Keyed insulator apparatus. 4,702,712, Cl. 439-596.000.

Gianopoulos, Thomas J.; and Becklin, Wallace W. Hemorrhoid retainers. 4,702,237, Cl. 128-98.100.

Gibbons, Patrice H.: *See—*
MacNeil, Tanya; and Gibbons, Patrice H., 4,703,009, Cl. 435-172.300.

Giehl, Klaus-Ulrich, to Lothar Steinhardt. Flow-control device. 4,702,271, Cl. 137-389.000.

Giese, John D., to Mepaco, Inc. Valve to control the rate and shape of a fluid stream. 4,702,279, Cl. 137-625.170.

Giesselmann, Juergen: *See—*
Leicht, Werner; Ruetz, Georg; and Giesselmann, Juergen, 4,702,672, Cl. 415-164.000.

Giguere, Jean-Paul, to Donat Flamand, Inc. Casing window. 4,702,050, Cl. 52-202.000.

Gill, Melvyn: *See—*
Rickards, Rodney W.; Gill, Melvyn; and Christie, Robert M., 4,703,127, Cl. 549-214.000.

Gillery, David J.: *See—*
Ellis, Cedric R.; Long, Peter O.; Marshman, Christopher A.; and Gillery, David J., 4,702,246, Cl. 128-303.100.

Gillespie, Roger J.; and Tully, Wilfred R., to Roussel Uclaf. 2-(1,2,4-oxadiazol-5-yl) and 2-(1,3,4-thiadiazol-2-yl-imidazo[1,2-a]pyrimidines. 4,703,049, Cl. 514-258.000.

Gilljam, Hans N.; Chardon, Manfred; Getzald, Gregor; and Illig, Heinz-Peter, to Joseph Zimmermann. Coil carrier. 4,702,433, Cl. 242-118.100.

Gilmore, Carl D.: *See—*
Mork, Phillip W.; Kraschnewski, Melvin W.; and Gilmore, Carl D., 4,702,524, Cl. 299-64.000.

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Cornell, William D.; Gilson, Richard W.; Burkholder, Richard A.; and Ausherman, Ronald W., 4,702,261, Cl. 128-754.000.

Giori, Claudio; and Mylonakis, Stamatios G., to Borg-Warner Chemicals, Inc. Grafted nitrile rubber blends as thermoplastic elastomers. 4,703,083, Cl. 525-87.000.

Giori, Claudio; and Mylonakis, Stamatios G., to Borg-Warner Chemicals, Inc. Thermoplastic compositions containing nitrile rubber. 4,703,084, Cl. 525-87.000.

Girard, Andre . Picture multiplex analysis hybrid device. 4,703,361, Cl. 358-260.000.

Gjeruldsen, Erik: *See—*
Stageboe, Jan; and Gjeruldsen, Erik, 4,702,648, Cl. 405-224.000.

Glaenzer Spicer: *See—*
Orain, Michel A., 4,702,723, Cl. 464-120.000.

Glidden Company, The: *See—*
Owens, Phillip M., 4,703,071, Cl. 523-403.000.

Glover, Roy A.; Coyle, Peter; and Lee, Denis C. Multiple substructure anatomical organ model. 4,702,701, Cl. 434-270.000.

Gockel, Karl-Heinz; and Mostofizadeh-Ghalamfarsa, Chapar, to Fried. Krupp Gesellschaft mit Beschrankter Haftung. Method and apparatus for converting low temperature heat into useful heat. 4,702,085, Cl. 62-101.000.

Godesa, Ludvik: *See—*
Bohnen, Peter; Godesa, Ludvik; Kugler, Reinhard; and Marquardt, Ulrich, 4,703,137, Cl. 200-50.0AA.

Godfrey, Craig W.: *See—*
Gano, John C.; Schwendemann, Kenneth L.; Noack, Timothy J.; and Godfrey, Craig W., 4,702,320, Cl. 166-343.000.

Godlewski, Robert E., to Union Carbide Corporation. Integral additives and methods for making filled thermoplastics. 4,703,082, Cl. 524-731.000.

Golbeck, Ortwin: *See—*
Guenther, Hans-Juergen; Golbeck, Ortwin; and Nauck, Joachim, 4,702,440, Cl. 244-158.00R.

Gold Star Co., Ltd.: *See—*
Sohn, Sang H., 4,703,225, Cl. 313-587.000.

Golden, Timothy C.: *See—*
Sircar, Shivaji; and Golden, Timothy C., 4,702,749, Cl. 55-33.000.

Goldfarb, Adolph E. Solar-powered musical ornaments and novelties. 4,702,140, Cl. 84-1.010.

Goldstein, David, to United States of America, Navy. Glass-lined pipes. 4,702,884, Cl. 419-8.000.

Golwas, Robert F.; Pennison, Robert A.; and Eckman, Richard E., to Dresser Industries, Inc. Positive feed drill use counter. 4,702,650, Cl. 408-6.000.

Good, Daniel H.: *See—*
Good, David S.; and Good, Daniel H., 4,702,091, Cl. 66-171.000.

Good, David S.; and Good, Daniel H. Cuff member and sock. 4,702,091, Cl. 66-171.000.

Goodman, William. Potter's wheel with rotating extruder. 4,702,920, Cl. 425-459.000.

Goodson, Larry E.: *See—*
Rumbolt, Robin B.; McIntyre, William R.; and Goodson, Larry E., 4,703,359, Cl. 358-194.100.

Goodyear Tire & Rubber Company, The: *See—*
Brayer, Randall R., 4,702,292, Cl. 152-209.00R.

Goossens, John; Oppermann, Gunter; and Grape, Wolfgang, to Bayer Aktiengesellschaft. Electroviscous fluids. 4,702,855, Cl. 252-75.000.

Gorman, Eileen G.: *See—*
Craig, Alan R.; and Gorman, Eileen G., 4,703,018, Cl. 436-518.000.

Gortz, Norman, to Infusion Systems Corporation. Pressurized fluid dispenser. 4,702,397, Cl. 222-211.000.

Goshow, Henry M. Shelf for hospital bed. 4,702,176, Cl. 108-9.000.

Goss, Gary J.; Holtey, Thomas O.; and Siwik, James C., to Honeywell Information Systems Inc. Variable loadable character generator. 4,703,322, Cl. 340-750.000.

Gosselink, Eugene P., to Procter & Gamble Company, The. Block polyesters and like compounds useful as soil release agents in detergent compositions. 4,702,857, Cl. 252-174.210.

Goto, Makoto; Okabe, Takao; and Komori, Akihiro, to Brother Kogyo Kabushiki Kaisha. EDM control system to maximize efficiency by controlling the gap width. 4,703,144, Cl. 219-69.00P.

Goto, Masahiro: *See—*
Tokura, Norihito; Kawai, Hisasi; Goto, Masahiro; Morino, Seiji; and Soumiya, Masato, 4,702,221, Cl. 123-606.000.

Goto, Seiichi: *See—*
Shiba, Toyoaki; Goto, Seiichi; and Ito, Keishi, 4,702,024, Cl. 37-67.000.

Gotoh, Toshihiko: *See—*
Kobori, Yasunori; Hanma, Kentaro; and Gotoh, Toshihiko, 4,703,366, Cl. 358-335.000.

Gottfried, Mario H., to Power Group International Corp. Power source for starter motors. 4,703,188, Cl. 290-38.00B.

Guyo Paper Working Co., Ltd.: *See—*
Ohara, Shuzo; and Kitamura, Ryoichi, 4,702,874, Cl. 264-171.000.

Gozzo, Franco: *See—*
Camaggi, Giovanni; Gozzo, Franco; Signorini, Ernesto; and Palla, Ottorino, 4,702,762, Cl. 71-90.000.

GQ Defence Equipment Limited: *See—*
Nordberg, Anthony, 4,702,699, Cl. 434-20.000.

Graber, Joseph V.; and Severson, Ervin L., to Graber Products, Inc. Bicycle support device. 4,702,401, Cl. 224-42.03B.

Graber Products, Inc.: *See*—
Graber, Joseph V.; and Severson, Ervin L., 4,702,401, Cl. 224-42.03B.
Grabow, Dieter, to Messerschmitt-Boelkow-Blohm. Apparatus for venting a kitchen, especially an onboard kitchen in an aircraft. 4,702,153, Cl. 98-1.000.
Gradeff, Peter S.; and Schreiber, Fred G., to Rhone-Poulenc, Inc. Tricyclopentadienyl cerium and process for preparing the same. 4,703,109, Cl. 534-15.000.
Graham, Paul R.: *See*—
Barczak, Virgil J.; Baldwin, Roger A.; and Graham, Paul R., 4,702,899, Cl. 423-244.000.
Grandinetti, Tony: *See*—
Pora, Tom; and Grandinetti, Tony, 4,702,098, Cl. 72-351.000.
Grant, Barrie D.: *See*—
Ratzlaff, Marc H.; Frame, John M.; and Grant, Barrie D., 4,703,217, Cl. 310-338.000.
Grant, George S., to Ferranti, plc. Dither mechanism for ring laser gyroscope. 4,702,602, Cl. 356-350.000.
Grant, Ralph M., to Industrial Holographics, Inc. Double exposure interferometric analysis of structures and employing ambient pressure stressing. 4,702,594, Cl. 356-35.500.
Grape, Wolfgang: *See*—
Goossens, John; Oppermann, Gunter; and Grape, Wolfgang, 4,702,855, Cl. 252-75.000.
Grass Valley Group, Inc., The: *See*—
Lake, David E., Jr., 4,703,447, Cl. 364-724.000.
Gravemann, Horst, to Kabel-und Metallwerke Gutehoffnungshuette AG. Mold for continuous casting and method of making. 4,702,299, Cl. 164-137.000.
Gravenstein, Joachim S.; and Lampotang, Samsun, to University of Florida. Self-contained jet pump breathing apparatus. 4,702,241, Cl. 128-204.250.
Graves, William H., Jr., to R. J. Reynolds Tobacco Company. Tobacco leaf processing. 4,702,264, Cl. 131-370.000.
Greasley, Michael J.; and Manning, Richard J., to Standard Machinery Limited. Lockstitch sewing machine. 4,702,183, Cl. 112-38.000.
Green, Charles J.: *See*—
Ambruster, Kurt; Green, Charles J.; and Morris, John M., 4,702,268, Cl. 137-202.000.
Greenlee, Donald R.; and Lustig, Lee M., to Dresser Industries, Inc. Slip and slip assembly for well tools. 4,702,313, Cl. 166-216.000.
Greenwood, David: *See*—
Baxter, Anthony G. W.; Bostock, Stephen B.; and Greenwood, David, 4,703,113, Cl. 534-796.000.
Gregory, Thomas D.; and Hoffman, Ronald J., to Dow Chemical Company, The. Electrochemical generator utilizing solid polymer-salt complex. 4,702,974, Cl. 429-50.000.
Gresa, Ludwig: *See*—
Fux, Kamil; and Gresa, Ludwig, 4,702,847, Cl. 210-798.000.
Griffing, Bruce F.; and West, Paul R., to General Electric Company. Method of enhancing the contrast of images and materials therefor. 4,702,996, Cl. 430-325.000.
Griffith, Dwight E. Barbecue pit. 4,702,224, Cl. 126-8.000.
Grigsby, Beverly A.: *See*—
Grigsby, Samuel H.; and Grigsby, Beverly A., 4,702,016, Cl. 34-33.000.
Grigsby, Samuel H.; and Grigsby, Beverly A. Apparatus for drying shoes in a dryer. 4,702,016, Cl. 34-33.000.
Griselli, Pierluigi: *See*—
Ferraresi, Andrea; and Griselli, Pierluigi, 4,703,090, Cl. 525-246.000.
Griswold, Frederick D., Jr.: *See*—
Whisler, Edwin L.; Griswold, Frederick D., Jr.; and Neagle, Stuart L., 4,702,520, Cl. 297-417.000.
Grohe, Klaus: *See*—
Petersen, Uwe; Grohe, Klaus; Zeiler, Hans-Joachim; and Metzger, Karl G., 4,703,047, Cl. 514-254.000.
Grone, Horst D., to Lin Tec Verpackungstechnik GmbH. Tray for receiving foodstuffs and a process and apparatus for producing it. 4,702,377, Cl. 206-557.000.
Grosse, Hillman R. Centering fixture for wood turning lathe. 4,702,132, Cl. 82-40.00R.
Grover, Bhadra S., to Union Carbide Corporation. Process for the removal of acid gases from gas mixtures. 4,702,898, Cl. 423-220.000.
Grumman Aerospace Corp.: *See*—
Frank, Arthur M., 4,702,309, Cl. 165-104.310.
Schmitz, Charles E., 4,703,170, Cl. 250-211.00R.
Grunst, Heinz, to Square D Starkstrom GmbH. Actuation attachment for electrical controlling and signalling devices, particularly for emergency circuit breakers. 4,703,141, Cl. 200-340.000.
GSE Electronic Systems, Inc.: *See*—
Roggendorf, Peter, 4,703,311, Cl. 340-347.0DD.
Gsell, Thomas C.: *See*—
Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., 4,702,840, Cl. 210-638.000.
Pall, David B.; Degen, Peter J.; Gsell, Thomas C.; and Yanakis, Eleni C., 4,702,947, Cl. 428-36.000.
GT Development Corporation: *See*—
Ambruster, Kurt; Green, Charles J.; and Morris, John M., 4,702,268, Cl. 137-202.000.
GTE Communication Systems Corporation: *See*—
Abrant, Robert J.; Martys, Michael D.; and Tarleton, George K., 4,703,421, Cl. 364-200.000.
Abrant, Robert J.; Martys, Michael D.; and Tarleton, George K., 4,703,452, Cl. 364-900.000.
GTE Laboratories Incorporated: *See*—
Chen, Wen T., 4,703,281, Cl. 328-28.000.
Haselton, E. Fletcher; Amstutz, Stanford A.; and Lenart, Joseph M., 4,703,478, Cl. 370-94.000.
Sarin, Vinod K.; and Hintermann, Hans E., 4,702,970, Cl. 428-688.000.
GTE Products Corporation: *See*—
Cheresnowsky, Michael J.; Brunelli, Timothy A.; and Kim, Tai K., 4,702,895, Cl. 423-54.000.
Morris, Merle E.; and Senft, Stephen P., 4,702,717, Cl. 445-27.000.
Rattray, Kendrick D.; and Plante, Leo J., 4,703,224, Cl. 313-487.000.
Guatelli, Jean-Luc: *See*—
Aboukrat, Simon; Catoir, Lucien; Guatelli, Jean-Luc; and Sobiepanek, Janusz, 4,703,212, Cl. 310-218.000.
Guenther, Hans-Juergen; Golbeck, Ortwin; and Nauck, Joschim, to Erno Raumfahrttechnik GmbH. Satellite station. 4,702,440, Cl. 244-158.00R.
Guerra, Michael, to Eaton Corporation. Ion implantation chamber purification method and apparatus. 4,703,183, Cl. 250-492.200.
Guerrini, Giampaolo; and Sommacal, Franco, to Ing. C. Olivetti & C., S.p.A. Device for detecting the level of a liquid contained in a tank. 4,702,107, Cl. 73-319.000.
Guibert, Raul. Articulated hand-held exercise. 4,702,474, Cl. 272-122.000.
Guile, Peter J. D., to Exxon Production Research Company. System for connecting two members together. 4,702,636, Cl. 403-24.000.
Guinot, Philippe M., to Societe de Conseils de Recherches et d'Applications Scientifiques. Therapeutic compositions for the treatment of hangover. 4,703,045, Cl. 514-159.000.
Gullberg, Grant T.; and Crawford, Carl R., to General Electric Company. Method and means of correcting for a shift in the center of rotation of a rotating fan beam CT system. 4,703,424, Cl. 364-414.000.
Gunther, Feyerl; Kalteis, Augustin; and Hannes, Pum, to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft. Apparatus for making needle felts for paper machines. 4,701,986, Cl. 28-142.000.
Guthrie, William L.: *See*—
Chow, Ming-Fea; Guthrie, William L.; and Kaufman, Frank B., 4,702,792, Cl. 156-628.000.
Gutierrez, Antonio; Brois, Stanley J.; Ryer, Jack; and Deen, Harold E., to Exxon Research & Engineering Co. Power transmitting fluids containing esters of hydrocarbyl succinic acid or anhydride with thio-bis-alkanols. 4,702,850, Cl. 252-48.200.
Gwiazda, Ronald E. Apparatus for preserving and dispensing wine. 4,702,396, Cl. 222-152.000.
Gyngell, Michael L.; and Nayler, Graham L., to Picker International, Ltd. Clean multiple echo magnetic resonance imaging using asymmetric sequences. 4,703,268, Cl. 324-309.000.
Gyokhegyi, Laszlo . Process and apparatus for the determination of column tray efficiency. 4,702,801, Cl. 203-1.000.
H. B. Fuller Company: *See*—
Hume, Robert M., III, 4,702,496, Cl. 281-15.00R.
H. Finger, Firma: *See*—
Finger, Hansjorg, 4,702,612, Cl. 368-10.000.
Haeberle, Fritz: *See*—
Huth, Lothar; Dahm, Horst; Moetting, Goetz; and Haeberle, Fritz, 4,703,398, Cl. 362-61.000.
Hagen, Kenneth G.: *See*—
Taylor, Bruce F.; and Hagen, Kenneth G., 4,702,015, Cl. 34-20.000.
Hager, Jeffrey J., to G & H Technology, Inc. Environmental seal and alignment means for an electromagnetically formed backshell. 4,702,543, Cl. 439-271.000.
Haggerty, William T., to Wang Laboratories, Inc. Character-based monochromatic representation of color images. 4,703,318, Cl. 346-723.000.
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Hahn, Gunther: *See*—
Backer, Wolfgang; Wagner, Wolfram; Hahn, Gunther; and Miessen, Ralf, 4,701,980, Cl. 19-0.480.
Hahn, Paul M.: *See*—
Jones, Michael P.; and Hahn, Paul M., 4,702,193, Cl. 114-354.000.
Hahn, Peter S.; Stone, Thomas R.; Moon, William G.; and Harrison, Joel N., to Plus Development Corporation. Compact polyphase optical position encoder. 4,703,176, Cl. 250-231.0SE.
Haino, Kozo; Emoto, Kazuhiro; and Itoh, Akira, to Mitsubishi Paper Mills, Ltd. Electrophotographic photoreceptor comprising bis-azo pigment. 4,702,983, Cl. 430-75.000.
Hako Minuteman, Inc.: *See*—
Palmer, Gary E.; and Todd, Mike J., 4,701,976, Cl. 15-385.000.
Hale, Judy. Golf cart entertainment system. 4,702,342, Cl. 180-333.000.
Hall, Laurance D.; and Norwood, Timothy J., to University of British Columbia, The. Zero quantum NMR imaging and spectroscopy in a low homogeneity magnetic field. 4,703,270, Cl. 324-309.000.
Hallberg, Karl R. S. Method and device for detecting wheels with deformed treads in railroad vehicles. 4,702,104, Cl. 73-146.000.
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Colle, Edward A., Jr.; Yates, Donald N., Jr.; and Brieger, Emmet F., 4,702,168, Cl. 102-313.000.
Penny, Glenn S., 4,702,849, Cl. 252-8.554.
Halvorsen, James: *See*—
Dzewaltowski, Victor F.; Halvorsen, James; and Check, John M., 4,703,142, Cl. 219-69.00M.

Hamada, Masataka: *See*—
Taniguchi, Nobuyuki; Omaki, Takanobu; Ishikawa, Norio; Nakai, Masaaki; Ishida, Tokuji; and Hamada, Masataka, 4,702,584, Cl. 354-400.000.

Hamada, Shigeki: *See*—
Yoshioka, Sadashichi; Matsuoka, Tsutomu; Hamada, Shigeki; and Hinatase, Humio, 4,702,218, Cl. 623-559.000.

Hamaguchi, Hiroaki: *See*—
Yokoyama, Yoichi; Hamaguchi, Hiroaki; and Yamamoto, Masatoshi, 4,703,294, Cl. 335-121.000.

Hamano, Tsutomu; and Shikano, Hiroshi, to NCR Corporation. Apparatus for adjusting the print head gap in a dot matrix printer. 4,702,629, Cl. 400-56.000.

Hamilton, Mark, to Rokon International, Inc. Motorcycle apparatus. 4,702,340, Cl. 180-224.000.

Hammerton, Denis, to Polaroid Corporation. Direct readout dissolved gas measurement apparatus. 4,702,102, Cl. 73-19.000.

Hampton, Edward J.: *See*—
Porowski, Jan S.; Badlani, Manu L.; O'Donnell, William J.; and Hampton, Edward J., 4,702,880, Cl. 376-305.000.

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Haneda, Satoshi: *See*—
Fukuchi, Masakazu; and Haneda, Satoshi, 4,702,987, Cl. 430-122.000.

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Hideg, Kalman; Hankovsky, Olga H.; Frank, Laszlo ; Bodi, Ilona; and Csak, Jozsef, 4,703,056, Cl. 514-414.000.

Hanma, Kentaro: *See*—
Kobori, Yasunori; Hanma, Kentaro; and Gotoh, Toshihiko, 4,703,366, Cl. 358-335.000.

Hannam, Peter H.: *See*—
Brooks, Kenneth J.; Wilkinson, Michael A.; Hannam, Peter H.; and Whiteside, Neil A., 4,702,252, Cl. 128-344.000.

Hannes, Pum: *See*—
Gunther, Feyerl; Kalteis, Augustin; and Hannes, Pum, 4,701,986, Cl. 28-142.000.

Hannon, Charles N., to Stepper, Inc. Multi-purpose feeder for successively delivering single sheet or multi-leaved articles from a stack thereof. 4,702,467, Cl. 271-133.000.

Hano, Sunao: *See*—
Yamaguchi, Kirotsugu; Fukushima, Naoto; Akatsu, Yousuke; and Hano, Sunao, 4,702,490, Cl. 280-707.000.

Hanover Research Corporation: *See*—
Bonanno, Anthony J., 4,702,798, Cl. 159-47.100.

Hansen, Kurt L.; and VanDenburgh, Ronald J., to General Electric Company. Method for assembly of tangential entry dovetailed bucket assemblies on a turbomachine bucket wheel. 4,702,673, Cl. 416-215.000.

Hansen, Robert D.: *See*—
Klimpel, Richard R.; and Hansen, Robert D., 4,702,822, Cl. 209-166.000.

Hanson, Gary R., to Minnesota Mining and Manufacturing Company. Backing for binding sheets. 4,702,659, Cl. 412-4.000.

Hanssens, Theodoor R.: *See*—
Koerts, Kees; and Hanssens, Theodoor R., 4,702,839, Cl. 210-638.000.

Hanyu, Susumu; Kasuga, Noburu; Hara, Kazumasa; and Koike, Mikio, to Janome Sewing Machine Co., Ltd. Sewing machine with an automatic thread tension device. 4,702,185, Cl. 112-254.000.

Happ, Lawrence R.; Stark, Gerald A.; and Drensky, Stephen M., to Cherry Corporation, The. Probe actuated switch. 4,703,147, Cl. 219-10.55C.

Hara, Kazumasa: *See*—
Hanyu, Susumu; Kasuga, Noburu; Hara, Kazumasa; and Koike, Mikio, 4,702,185, Cl. 112-254.000.

Hara, Masato: *See*—
Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, 4,702,008, Cl. 33-1.00T.

Harada, Tetsuro: *See*—
Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, 4,702,927, Cl. 426-467.000.

Harada, Yoshihito; Kiuchi, Masayoshi; Kobayashi, Ryuichi; and Kawamura, Masaharu, to Canon Kabushiki Kaisha. Analog-to-digital converter for camera. 4,702,585, Cl. 354-410.000.

Hardt, Peter, to Lonza Ltd. Process for the production of 7-ethyl indole. 4,703,126, Cl. 548-508.000.

Hardy Spicer Limited: *See*—
Sankey, Ivor G., 4,702,526, Cl. 301-6.0WB.

Harilainen, Eero. Bottom structure of a boat. 4,702,188, Cl. 114-56.000.

Harries, John. Rotary positive displacement machine. 4,702,206, Cl. 123-246.000.

Harris Corporation: *See*—
Beckwith, Paul B.; Bistarkey, Donald S.; Pohedra, Joseph J.; and Trimble, Donald E., 4,702,698, Cl. 434-2.000.
Black, Jimmy C.; and Roberts, Bruce E., 4,702,967, Cl. 428-620.000.
Matlock, Dyer A.; Lichtel, Richard L., Jr.; and Pearce, Lawrence G., 4,702,000, Cl. 437-63.000.
Rolfe, Robert M.; and Falkenstrom, Lee J., 4,703,484, Cl. 371-25.000.
Seiler, Norman C.; and Walker, Stephen S., 4,703,505, Cl. 381-51.000.

Harris Press & Shear, Inc.: *See*—
Curles, Curtis T., 4,702,403, Cl. 225-96.500.

Harrison, Joel N.: *See*—
Hahn, Peter S.; Stone, Thomas R.; Moon, William G.; and Harrison, Joel N., 4,703,176, Cl. 250-231.0SE.

Harrold, William J.: *See*—
Howarth, Thomas R.; Flanagan, Peter F.; Harrold, William J.; and Rodberg, Kenneth, 4,703,464, Cl. 367-156.000.

Hartley, Quentin J. S.; and Christen, Daniel G., to Hartley, Quentin John Seaton. Water sprinklers for irrigation systems. 4,702,417, Cl. 239-98.000.

Hartley, Quentin John Seaton: *See*—
Hartley, Quentin J. S.; and Christen, Daniel G., 4,702,417, Cl. 239-98.000.

Hartmann, Dirck T. Multiple speed driving wheel for pedal powered vehicles. 4,702,121, Cl. 74-375.000.

Hartmann, Heinrich: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Klahr, Erhard; and Hettche, Albert, 4,702,858, Cl. 252-174.240.

Haruta, Kazumi; and Yoshida, Shigeru, to Aisan Kogyo Kabushiki Kaisha. System for reducing discharge of fuel vapor from fuel tank to atmosphere. 4,702,216, Cl. 123-520.000.

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Balaban, Alvin R.; Harwood, Leopold A.; Patel, Chandrakant B.; and Demmer, Walter H., 4,703,340, Cl. 358-19.000.

Hasegawa, Katsumi; Ohno, Michio; Nagayasu, Tadahito; and Umeda, Kazuo, to Toray Industries, Inc. Method for melt-spinning thermoplastic polymer fibers. 4,702,871, Cl. 264-101.000.

Haselton, E. Fletcher; Amstutz, Stanford A.; and Lenart, Joseph M., to GTE Laboratories Incorporated. Burst-switching method for an integrated communications system. 4,703,478, Cl. 370-94.000.

Hashimoto, Hiroshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Method and apparatus for modification of a single bit in a bit-addressable computer system. 4,703,413, Cl. 364-147.000.

Hashimoto, Kenshiro; and Okada, Yasushi, to Honda Giken Kogyo Kabushiki Kaisha. Oxygen concentration detection system. 4,702,816, Cl. 204-406.000.

Hashimoto, Shinichi: *See*—
Imai, Kazuo; Niigata, Kunihiro; Fujikura, Takashi; Hashimoto, Shinichi; and Takenaka, Toichi, 4,703,063, Cl. 514-603.000.

Hashimoto, Terukuni: *See*—
Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige; and Saijo, Hideo, 4,702,872, Cl. 264-114.000.

Hasimoto, Hirofumi: *See*—
Iwao, Nomura; Masuyama, Takayuki; Tanigawa, Yasuo; and Hasimoto, Hirofumi, 4,702,666, Cl. 414-730.000.

Hassenpflug, Wolfgang; and Schwable, Rainer, to Litef GmbH. Method for determining the horizontal airspeed of helicopters in low speed ranges. 4,702,106, Cl. 73-181.000.

Hastings, Allen M. Open air clothes dryer. 4,702,018, Cl. 34-130.000.

Hatabe, Yukio; and Komatsubara, Shoji, to Dainippon Screen Mfg. Co., Ltd. Apparatus for producing an electrophotographic print. 4,702,588, Cl. 355-10.000.

Hatamura, Koichi; and Asanomi, Koji, to Mazda Motor Corporation. Intake arrangement for internal combustion engine. 4,702,207, Cl. 123-302.000.

Hattori, Isao; and Enomoto, Akio, to NGK Insulators, Ltd. Cutting apparatus for ceramic green shaped bodies. 4,702,138, Cl. 83-785.000.

Hauff, Werner. Sealing body for feedthrough for at least one conducting member through a wall opening. 4,703,136, Cl. 174-152.00G.

Haugen, Harold M.: *See*—
Haugen, Per; Haugen, Harold M.; and De Jong, Ingolf J. C., 4,702,046, Cl. 52-144.000.

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Havel, Karel. Analog display timepiece. 4,702,615, Cl. 368-82.000.

Hawe, Malcolm: *See*—
Flesher, Peter; Farrar, David; Hawe, Malcolm; and Langley, John, 4,702,844, Cl. 210-733.000.

Hawiger, Jack J.; Timmons, Sheila; and Kloczewiak, Marek, to New England Deaconess Hospital Corporation. Method of producing biologically active molecules having extended life time. 4,703,039, Cl. 514-21.000.

Hawryluk, Raymond: *See*—
Johnson, Clyde R.; Hawryluk, Raymond; and Katrencik, Gerald, 4,702,694, Cl. 432-133.000.

Hayafuji, Yoshinori, to Sony Corporation. Faraday cups. 4,703,256, Cl. 324-71.300.

Hayakawa, Yoshiyuki: *See*—
Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, 4,702,927, Cl. 426-467.000.

Hayashi, Fumihiko: *See*—
Itoh, Masanori; and Hayashi, Fumihiko, 4,702,958, Cl. 428-323.000.

Hayashi, Katsuhiko: *See*—
Orii, Makoto; and Hayashi, Katsuhiko, 4,702,350, Cl. 185-39.000.

Hayashi, Kenji: *See*—
Matsuura, Kazuo; Nakahara, Katuzi; and Hayashi, Kenji, 4,702,980, Cl. 430-63.000.

Hayashi, Norifumi: *See*—
Miyauchi, Yukio; Nakagawa, Yuichi; Kurihara, Makoto; and Hayashi, Norifumi, 4,702,939, Cl. 42-195.000.

Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Rear wheel braking apparatus for motorcycle. 4,702,339, Cl. 180-219.000.

Hayes, Peter F., to Omniverse Research, Inc. MIG welder attachment for an electric hand drill. 4,703,156, Cl. 219-136.000.

Haythornthwaite, James. Glass razor blade and handle. 4,702,004, Cl. 30-57.000.

Hayward, David J.: *See*—
Crupi, Joseph A.; Hayward, David J.; and Jones, David F., 4,703,416, Cl. 364-200.000.

Hazebrouck, Henry B., to Priam (Delaware) Corporation. Thermal compensation for disk drive carriage assembly. 4,703,377, Cl. 360-106.000.

Healy, Henry S.: *See*—
DiValentin, Eugene D.; and Healy, Henry S., 4,703,189, Cl. 290-44.000.

Healy, Lawrence R., Jr.: *See*—
Husmann, Robert J.; and Healy, Lawrence R., Jr., 4,703,313, Cl. 340-550.000.

Heath, Thomas V.: *See*—
Thomson, Allan R.; and Heath, Thomas V., 4,702,405, Cl. 228-2.000.

Heffernan, Edward J.; and Tomlinson, Ronald S., to Heil-Quaker Corporation. Control for heat pipe central furnace. 4,702,225, Cl. 126-116.00A.

Heide, Helmut; Etzkorn, Heinz-Werner; Poeschel, Eva; and Steininger, Helmut, to Battelle-Institute e.V. Method of producing implantable bone replacement materials. 4,702,930, Cl. 427-2.000.

Heidel, David W.: *See*—
Hensel, Robert J.; Wagner, James L.; Hundertmark, James M.; Sheridan, Stephen E.; and Heidel, David W., 4,702,202, Cl. 123-52.00M.

Heidelberger Druckmaschinen AG: *See*—
Jeschke, Willi; and Pollich, Gerhard, 4,702,469, Cl. 271-227.000.
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Heideman, Robert J., to Enertrols, Inc. Shock absorber with hole-on-groove configuration and with adjusting device. 4,702,355, Cl. 188-285.000.

Heideman, Torsten; Levander, Kai; and Salmi, Pekka, to Oy Wartsila Ab. Bottom construction for a ship. 4,702,187, Cl. 114-40.000.

Heijnemans, Werner A. L.: *See*—
Nieuwendijk, Joris A. M.; Heijnemans, Werner A. L.; Sluijterman, Albertus A. S.; and Vink, Nicolaas G., 4,703,232, Cl. 315-370.000.

Heikkila, Kurt E.: *See*—
Garlough, Greg D.; and Heikkila, Kurt E., 4,702,793, Cl. 156-629.000.

Heil-Quaker Corporation: *See*—
Heffernan, Edward J.; and Tomlinson, Ronald S., 4,702,225, Cl. 126-116.00A.

Heimbigner, Gary L., to Rockwell International Corporation. Uncompensated and compensated gallium arsenide input receivers. 4,703,205, Cl. 307-450.000.

Heinkel Industriezentrifugen GmbH & Co.: *See*—
Gerteis, Hans, 4,702,831, Cl. 210-236.000.

Heinonen, Jarmo; Wisakanto, Risto; and Strom, Rolf, to Oy Tampella AB. Bearing arrangement for a feeding device for a drilling machine. 4,702,621, Cl. 384-27.000.

Hellriegel, Edmund, to Dynamit Nobel AG. Door for a motor vehicle. 4,702,040, Cl. 49-502.000.

Helton, Charles J., III; and Panagiotou, George N., to Panagiotou, George N. Portable lighting device. 4,703,404, Cl. 362-294.000.

Helwig, Reinhard; Neumann, Peter; Aumueller, Alexander; and Trauth, Hubert, to BASF Aktiengesellschaft. Tetrahydrofurancarboxylic acid derivatives. 4,703,072, Cl. 524-99.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Tesmann, Holger; Blum, Helmut; and Koester, Rita, 4,702,823, Cl. 209-166.000.

Henley Burrowes & Co. Ltd.: *See*—
Finch, Maurice, 4,702,746, Cl. 44-14.000.

Henry, Daniel: *See*—
Catala, Gerard; Stowe, Ian; and Henry, Daniel, 4,703,427, Cl. 364-422.000.

Hensel, Robert J.; Wagner, James L.; Hundertmark, James M.; Sheridan, Stephen E.; and Heidel, David W., to Brunswick Corporation. Low profile internally packaged fuel injection system for two cycle engine. 4,702,202, Cl. 123-52.00M.

Herbst, Robert R. Devices for aiding astronomers to locate stars and other celestial bodies. 4,702,703, Cl. 434-289.000.

Hercules Incorporated: *See*—
Matlack, Albert S., 4,703,098, Cl. 526-283.000.
Nguyen, Tuyen T., 4,703,068, Cl. 521-150.000.

Herlemann, Werner: *See*—
Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, 4,702,518, Cl. 296-217.000.

Herman, David. Merchandise display assembly. 4,702,380, Cl. 211-57.100.

Hermann Wagner GmbH & Co. KG: *See*—
Borel, Georg, 4,702,952, Cl. 428-193.000.

Hernandez, Irene H.: *See*—
Barker, Barbara A.; and Hernandez, Irene H., 4,703,321, Cl. 340-747.000.

Herold, Gerald C.; and Jung, Harley A., to Parker Pen (Benelux) B.V. Continuous feed mechanical pencil with push button lead feed actuator. 4 702,634, Cl. 401-53.000.

Herre, Emil; Herre, Gerd; Zimmer, Guenter; and Cepin, Hermann, to Mannesmann AG. Charging electro furnaces. 4,702,461, Cl. 266-216.000.

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Herre, Emil; Herre, Gerd; Zimmer, Guenter; and Cepin, Hermann, 4,702,461, Cl. 266-216.000.

Herrero, Maria P.; and Holtwick, Joseph B., to Dow Chemical Company, The. O,O-dialkyl phosphoramidothioate plant growth enhancers. 4,702,761, Cl. 71-87.000.

Herrington, Richard A.; Kleman, Thomas G.; and Apolinar, Ermelinda A., to Libbey-Owens-Ford Co. Cutting strengthened glass. 4,702,042, Cl. 51-321.000.

Herzog, Rudolf, to Sulzer Brothers Limited. Apparatus for controlling a process variable of a flowing medium. 4,702,306, Cl. 165-36.000.

Herzog, William F.; and Nichols, William E., to Apert-Herzog Corporation. Television multiple frame store with cyclical repeat. 4,703,356, Cl. 358-160.000.

Hettche, Albert: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Klahr, Erhard; and Hettche, Albert, 4,702,858, Cl. 252-174.240.

Heuga Holding bv: *See*—
Slosberg, David K.; Reece, David S.; and Claessen, Johannes A. H., 4,702,950, Cl. 428-95.000.

Heuts, Jacobus J. F. G.; and Frens, Gerrit, to U.S. Philips Corporation. Electrochemical cell. 4,702,978, Cl. 429-218.000.

Hewlett-Packard Company: *See*—
Baumgartner, Richard A.; Dukes, John N.; and Fisher, George A., 4,703,251, Cl. 324-57.00R.
Bodenstab, Paul R., 4,703,457, Cl. 365-189.000.
Caine, Nathanael T.; and Simon, Jean-Jacques, 4,703,473, Cl. 370-15.000.
Fremont, Michael J., 4,703,481, Cl. 371-12.000.
James, David V., 4,703,418, Cl. 364-200.000.
Sharrit, David D., 4,703,433, Cl. 364-485.000.

Hewson, Brian: *See*—
Palmin, Simyon; and Hewson, Brian, 4,703,238, Cl. 318-563.000.

Hibbard Construction Co.: *See*—
Hibbard, Donald B., 4,702,053, Cl. 52-309.700.

Hibbard, Donald B., to Hibbard Construction Co. Composite insulated wall. 4,702,053, Cl. 52-309.700.

Hibberd, Frank L.: *See*—
Sommers, Dale C.; Hibberd, Frank L.; and Jayko, Doreen M., 4,702,690, Cl. 131-110.000.

Hic, Susanne: *See*—
Terranova, Victor P.; Wikesjo, Ulf M. E.; Genco, Robert J.; Hic, Susanne; and Lyall, Raymond M., 4,702,734, Cl. 604-54.000.

Hideg, Kalman; Hankovsky, Olga H.; Frank, Laszlo ; Bodi, Ilona; and Csak, Jozsef, to Alkaloida Vegyeszeti Gyar. New alkyl diamine derivatives. 4,703,056, Cl. 514-414.000.

Higashi, Mitsunobu: *See*—
Tanaka, Hiroyuki; Takami, Eiichi; Mishima, Kyoichi; Higashi, Mitsunobu; and Kumasaki, Toshimi, 4,702,729, Cl. 474-205.000.

Higbie, Robert E.; and Beebe, James C., to Eagle-Picher Industries, Inc. Method and apparatus for controlling the automatic inflation of tires for testing. 4,702,287, Cl. 141-4.000.

Higgs, Robert J.: *See*—
Shade, James W.; and Higgs, Robert J., 4,702,502, Cl. 285-231.000.

High Resolution Sciences, Inc: *See*—
Schine, Jonathan M., 4,703,319, Cl. 340-723.000.

Hight, Margaret A.: *See*—
Huang, Wann-Sheng; and Hight, Margaret A., 4,702,314, Cl. 166-245.000.

Higuchi, Matsuo; Komura, Osamu; and Kamijo, Eiji, to Director General, Agency of Industrial Science and Technology. Process for the production of ceramics. 4,702,869, Cl. 264-65.000.

Higuchi, Tomohisa: *See*—
Igi, Hisashi; Yamada, Tomohiro; Higuchi, Tomohisa; Ohta, Eiichi; and Yazawa, Hiroaki, 4,702,630, Cl. 400-82.000.

Hildebrand, Reinhard; and Kusuma, Djuanarto-Aci, to Siemens Aktiengesellschaft. Air guide assembly in automotive ventilating system. 4,702,155, Cl. 98-2.000.

Hill, Donnie K.: *See*—
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., 4,702,819, Cl. 208-354.000.

Hillbish, Warren C., to AMP Incorporated. Power contact having removable mating components. 4,702,707, Cl. 439-80.000.

Hilti Aktiengesellschaft: *See*—
Kerrom, Roger, 4,702,656, Cl. 411-60.000.

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Yoshioka, Sadashichi; Matsuoka, Tsutomu; Hamada, Shigeki; and Hinatase, Humio, 4,702,218, Cl. 623-559.000.

Hinman, Brian L., to PictureTel Corporation. Method and apparatus for efficiently communicating image sequences. 4,703,350, Cl. 358-133.000.

Hino, Isao: *See*—
Ojima, Juji; and Hino, Isao, 4,702,726, Cl. 474-101.000.

Hino, Youzi; and Ogawa, Hironobu, to Fujitsu Limited. Resistance ladder network. 4,703,302, Cl. 338-293.000.

Hinterholzer, Hans. Slalom post. 4,702,639, Cl. 404-10.000.

Hintermann, Hans E.: *See*—
Sarin, Vinod K.; and Hintermann, Hans E., 4,702,970, Cl. 428-688.000.

Hipp, James, to Hipp, James. Apparatus and method for driving casing or conductor pipe. 4,702,325, Cl. 173-64.000.

Hirabayashi, Hideo; Endo, Masami; and Kokubo, Kakuro, to Toa Nenryo Kogyo Kabushiki Kaisha. Utrasonic injecting method and injection nozzle. 4,702,414, Cl. 239-4.000.
Hiramatsu, Yoshiharu: *See*—
Adachi, Ikuo; Hiramatsu, Yoshiharu; Ueda, Motohiko; and Kawakami, Masaru, 4,703,051, Cl. 514-291.000.
Hiramitsu, Tetsushi: *See*—
Hirano, Atsuo; Hiramitsu, Tetsushi; and Ohno, Satoshi, 4,702,705, Cl. 439-15.000.
Hirano, Atsuo; Hiramitsu, Tetsushi; and Ohno, Satoshi, to Toyoda Gosei Co., Ltd. Steering wheel. 4,702,705, Cl. 439-15.000.
Hirano, Yasuo; and Nojima, Kazuo, to Ricoh Co., Ltd. Fixing roll. 4,702,964, Cl. 428-447.000.
Hirao, Kouji; Kuwana, Kazutaka; and Asami, Ken, to Aisin Seiki Kabushikikaisha; and Toyota Jidosha Kabushikikaisha. Apparatus for driving rod for rotation. 4,702,123, Cl. 74-526.000.
Hirasawa, Junichi: *See*—
Mochimaru, Hideaki; Shimada, Kazuyuki; and Hirasawa, Junichi, 4,703,334, Cl. 346-160.000.
Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, to Toshiba Battery Co., Ltd.; and Mitsubishi Petrochemical Co., Ltd. Secondary battery using non-aqueous solvent. 4,702,977, Cl. 429-194.000.
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Amano, Matsuo; Shida, Masami; Sakamoto, Masahide; Hirayama, Takeshi; and Sasayama, Takao, 4,703,430, Cl. 364-431.050.
Hirokawa, Ikuo: *See*—
Maehara, Junichiro; Izumi, Kenzo; and Hirokawa, Ikuo, 4,703,078, Cl. 524-476.000.
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, to Mitsubishi Petrochemical Co., Ltd.; Mitsubishi Chemical Industries, Ltd.; and Sanyo Fine Co., Ltd. Novel polypeptide and process for producing the same. 4,703,106, Cl. 530-307.000.
Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, to Fuji Oil Company, Ltd.; and Hosokawa Micron Corporation. Method for drying water retentive substance. 4,702,927, Cl. 426-467.000.
Hirsch, Eitan: *See*—
Tai, Reuven; Chaiat, Dov; and Hirsch, Eitan, 4,702,171, Cl. 102-476.000.
Hisano, Atsushi: *See*—
Saka, Kazuhiko; Hisano, Atsushi; Kato, Michitaka; Masaki, Toshimichi; and Nakatsuka, Nobuo, 4,703,512, Cl. 382-22.000.
Hisano, Atushi; Yamaguchi, Yoshinori; Masaki, Toshimichi; Saka, Kazuhiko; Nakatsuka, Nobuo; and Kato, Mitsutaka, to Omron Tateisi Electronics Co. Illumination system of the digital control type. 4,703,344, Cl. 358-60.000.
Hitachi Iruma Electronic Co., Ltd.: *See*—
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,702,556, Cl. 350-320.000.
Hitachi, Ltd.: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, 4,703,210, Cl. 310-154.000.
Amano, Matsuo; Shida, Masami; Sakamoto, Masahide; Hirayama, Takeshi; and Sasayama, Takao, 4,703,430, Cl. 364-431.050.
Endo, Shyusuke; Aoyama, Naofumi; Yabuuchi, Toshihiko; Sakuma, Toshiyuki; and Kinugawa, Kiyoshige, 4,702,560, Cl. 350-333.000.
Hoshi, Akio; and Oura, Toshiyuki, 4,702,371, Cl. 206-328.000.
Iguma, Akira; Okuda, Tadashi; Ieki, Kouichi; and Sasamoto, Toshio, 4,702,555, Cl. 350-247.000.
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,702,556, Cl. 350-320.000.
Kinameri, Kanji, 4,702,607, Cl. 356-432.000.
Kinoshita, Toshiyuki; Arai, Toshiaki; Sato, Takao; Kubo, Takashige; Yoshizawa, Yasufumi; and Mori, Hiromichi, 4,703,422, Cl. 364-200.000.
Kobori, Yasunori; Hanma, Kentaro; and Gotoh, Toshihiko, 4,703,366, Cl. 358-335.000.
Kumazawa, Kiyotake; Minamide, Noriaki; Moribe, Yoshihiro; Takahashi, Mikio; Beppu, Osamu; and Mitamura, Masahiro, 4,703,242. Cl. 318-685.000.
Nakanori, Takayuki; Kimura, Tomoaki; and Nishino, Tadashi, 4,702,300, Cl. 164-154.000.
Nishida, Takao; Hiyama, Toru; Moriwaki, Kaoru; Ishiyama, Shun; and Miyamoto, Shunsuke, 4,703,257, Cl. 324-73.00R.
Shinoda, Takashi; and Sakai, Osamu, 4,703,453, Cl. 365-104.000.
Takao, Kunihiko; Kawashima, Kenichi; Nakamura, Yozo; and Kishi, Atsuo, 4,702,684, Cl. 418-259.000.
Taya, Shunroku, 4,703,180, Cl. 250-425.000.
Yonezawa, Seiji; Kanazawa, Yasunori; and Tsuyoshi, Toshiaki, 4,703,408, Cl. 369-44.000.
Hitachi Maxell Ltd.: *See*—
Yonezawa, Seiji; Kanazawa, Yasunori; and Tsuyoshi, Toshiaki, 4,703,408, Cl. 369-44.000.
Hitachi Powdered Metals Co., Ltd.: *See*—
Takagi, Yoshiaki; Katsui, Yoshihiro; Endo, Hiroyuki; and Ikenoue, Yutaka, 4,702,771, Cl. 75-241.000.
Hitachi Tokyo Electronics Co., Ltd.: *See*—
Hoshi, Akio; and Oura, Toshiyuki, 4,702,371, Cl. 206-328.000.
Hiyama, Toru: *See*—
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Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang-i, to American Cyanamid Company. Platinum complexes of diaminodideoxy sugars and di- or tricarboxylic acids. 4,703,115, Cl. 536-55.000.
HMS Products Co.: *See*—
Sofy, Hugh M., 4,702,363, Cl. 192-150.000.
Hochstein, Peter A. Rain sensor. 4,703,237, Cl. 318-483.000.
Hodgins, George R., to James River Graphics, Inc. Anti-brick/anti-static compositions useful for treating film surfaces and films coated therewith. 4,703,000, Cl. 430-493.000.
Hoechst Aktiengesellschaft: *See*—
Fischer, Edgar; and Schlingmann, Merten, 4,703,117, Cl. 536-114.000.
Mischke, Peter; and Schlafer, Ludwig, 4,703,112, Cl. 534-642.000.
Muck, Karl-Friedrich; and Burg, Karlheinz, 4,703,129, Cl. 549-368.000.
Rieck, Hans-Peter; Schott, Martin; and Russow, Jurgen, 4,703,029, Cl. 502-243.000.
Hoffman, Ronald J.: *See*—
Gregory, Thomas D.; and Hoffman, Ronald J., 4,702,974, Cl. 429-50.000.
Hoffner, Daniel A. E.; and Trautmann, Jean-Marie C., to Thann et Mulhouse. Preparation of pigmentary red iron oxides. 4,702,776, Cl. 106-309.000.
Hofling, Erich; and Maly, Zdenek, to Swiss Aluminium Ltd. Method and apparatus for the determination of the thickness of transparent layers of lacquer. 4,703,187, Cl. 250-571.000.
Hofmann Werkstatt-Technik GmbH: *See*—
Wenz, Friedrich, 4,702,103, Cl. 73-146.000.
Hoganas AB: *See*—
Engstrom, Ulf F. I.; Allroth, Sven E.; and Mustonen, Olavi M., 4,702,772, Cl. 75-243.000.
Hogh, Josef; and Schacht, Hans, to Robert Bosch GmbH. Fluid filter apparatus and the method of manufacture. 4,702,790, Cl. 156-293.000.
Hohl, Frank: *See*—
Lange, Werner; Hohl, Frank; and Szablikowski, Klaus, 4,703,087, Cl. 525-161.000.
Hohulin, Samuel E.: *See*—
Hampton, Leonard; and Hohulin, Samuel E., 4,701,975, Cl. 15-383.000.
Holden, Thomas W. Noise reduction system. 4,703,507, Cl. 381-94.000.
Hole, Victor H. R.: *See*—
Camp, Philip G.; Macklen, Eric D.; Hole, Victor H. R.; and Hutcherson, David R., 4,702,619, Cl. 374-144.000.
Holland, G. Neil, to Picker International, Inc. Method and apparatus to compensate for eddy currents in magnetic resonance imaging. 4,703,275, Cl. 324-318.000.
Holland, John F., to American Energy Services, Inc. Sonic wood testing apparatus and method. 4,702,111, Cl. 73-579.000.
Holland-Letz, Guenter; Jaeger, Waldemar; Tewes, Udo; and Weigel, Peter, to Nixdorf Computer AG. Device for receiving, inspecting and storing instruments of value. 4,703,162, Cl. 235-379.000.
Hollingsworth U.K., Ltd.: *See*—
Whiteley, John; and Shepherd, Fred A., 4,702,068, Cl. 57-401.000.
Hollowell, John F.: *See*—
Hollowell, John R.; and Hollowell, John F., 4,702,037, Cl. 49-114.000.
Hollowell, John R.; and Hollowell, John F. Service window. 4,702,037, Cl. 49-114.000.
Hollweck, Walter; and Eberl, Karlheinz, to Inter Control Hermann Kohler Elektrik GmbH & Co. KG. Thermally-controlled electrical switching element, particularly temperature regulator or temperature limiter. 4,703,301, Cl. 337-367.000.
Holmes Products Corp.: *See*—
Shao, Shih-Chin, 4,703,152, Cl. 219-370.000.
Holt, Albert C., to J. A. Green Company. Method and apparatus for measuring metal hardness utilizing longitudinal and transverse ultrasonic wave time-of-flight. 4,702,110, Cl. 73-573.000.
Holtey, Thomas O.: *See*—
Goss, Gary J.; Holtey, Thomas O.; and Siwik, James C., 4,703,322, Cl. 340-750.000.
Holtwick, Joseph B.: *See*—
Herrero, Maria P.; and Holtwick, Joseph B., 4,702,761, Cl. 71-87.000.
Holtz, Neal. Joist system for forming concrete slabs. 4,702,059, Cl. 52-651.000.
Holyoak, Hugh K. Birdhouse assembly. 4,702,198, Cl. 119-23.000.
Homma, Tammotsu: *See*—
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, 4,703,106, Cl. 530-307.000.
Honda Giken Kogyo Kabuhiki Kaisha: *See*—
Anno, Nobuo; and Arai, Takeo, 4,702,204, Cl. 123-196.0AB.
Honda Giken Kogyo K.K.: *See*—
Kato, Akira; Igarashi, Hisashi; and Umeda, Tadashi, 4,702,211, Cl. 123-421.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Hashimoto, Kenshiro; and Okada, Yasushi, 4,702,816, Cl. 204-406.000.
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,702,339, Cl. 180-219.000.
Imoto, Kosuke; and Koyama, Kazutoshi, 4,702,222, Cl. 123-643.000.
Kawano, Akio, 4,702,527, Cl. 301-9.0DN.
Odo, Satoshi; Iida, Tetsuo; Abe, Atsushi; and Tsuchida, Makoto, 4,702,201, Cl. 123-2.000.
Takagi, Yoshiaki; Katsui, Yoshihiro; Endo, Hiroyuki; and Ikenoue, Yutaka, 4,702,771, Cl. 75-241.000.

Yasuoka, Akimasa; and Kiuchi, Takeo, 4,702,210, Cl. 123-339.000.
Yasuoka, Akimasa, 4,702,213, Cl. 123-480.000.

Honda, Haruhisa: *See*—
Saito, Takashi; Nitanda, Hiroshi; Inuzuka, Tsuneki; Tokuhara, Mitsuhiro; and Honda, Haruhisa, 4,702,586, Cl. 355-3.00R.

Honda, Yukio, to Murata Manufacturing Co., Ltd. Electronic components series. 4,702,370, Cl. 206-331.000.

Honeywell Inc.: *See*—
Beckey, Thomas J.; and Kallas, Kerry M., 4,702,305, Cl. 165-12.000.
Beckey, Thomas J.; Kallas, Kerry M.; and Uhrich, Daniel T., 4,702,413, Cl. 236-46.00R.
Gallant, W. Keith, 4,702,169, Cl. 102-401.000.

Honeywell Information Systems Inc.: *See*—
Goss, Gary J.; Holtey, Thomas O.; and Siwik, James C., 4,703,322, Cl. 340-750.000.
Morganti, Victor M.; and Prange, Patrick E., 4,703,417, Cl. 364-200.000.
Noyes, Robert W., 4,702,542, Cl. 439-347.000.

Hong, James K. Therapeutic inflatable lumbar brace having a heater. 4,702,235, Cl. 128-78.000.

Honjo, Masahiro, to Matsushita Electric Industrial Co., Ltd. Noise reduction feedback type comb filter. 4,703,343, Cl. 358-36.000.

Honkomp, Glenn A.: *See*—
Bowsky, Benjamin; Honkomp, Glenn A.; Burrows, Larry G.; and Wilson, Edward E., 4,702,976, Cl. 429-181.000.

Hoover Universal, Inc.: *See*—
Vail, Curtis F.; and Witzke, Duane W., 4,702,522, Cl. 297-452.000.

Hopp, Thomas P.; Bektesh, Susan L.; Conlon, Paul J., III; and March, Carl J., to Immunex Corporation. Synthesis of protein with an identification peptide. 4,703,004, Cl. 435-68.000.

Hoppe, Wolfgang: *See*—
Beckmann, Friedrich K.; Dotsch, Horst; and Hoppe, Wolfgang, 4,702,557, Cl. 350-330.000.

Hori, Yasuaki; and Kishima, Masayoshi, to Nissan Motor Company, Limited; and Ohi Seisakusho Company, Limited. Hinge structure for vehicle. 4,701,977, Cl. 16-266.000.

Horie, Michihiko: *See*—
Tsuruno, Masayoshi; and Horie, Michihiko, 4,702,019, Cl. 34-168.000.

Horton, Edward E. Drilling, production and oil storage caisson for deep water. 4,702,321, Cl. 166-350.000.

Horvath, Gyula: *See*—
Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.

Horvath, Stephen J.: *See*—
Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., 4,703,172, Cl. 250-223.00R.

Husaka, Akio; and Takase, Sadao, to Nissan Motor Co., Ltd. Power train control method on common input data. 4,703,428, Cl. 364-424.100.

Hosaka, Sumio: *See*—
Moriyama, Yoshiaki; and Hosaka, Sumio, 4,703,369, Cl. 358-343.000.

Hoshi, Akio; and Oura, Toshiyuki, to Hitachi, Ltd.; and Hitachi Tokyo Electronics Co., Ltd. Container for electrical components. 4,702,371, Cl. 206-328.000.

Hoshino Gakki Co., Ltd.: *See*—
Hoshino, Yoshihiro, 4,702,382, Cl. 211-134.000.

Hoshino, Yoshihiro, to Hoshino Gakki Co., Ltd. Erectable display structure with repositionable display shelf sections. 4,702,382, Cl. 211-134.000.

Hosokawa Micron Corporation: *See*—
Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, 4,702,927, Cl. 426-467.000.

Hosono, Hideo: *See*—
Abe, Yoshihiro; and Hosono, Hideo, 4,703,019, Cl. 501-13.000.

Hospal A.G.: *See*—
Aldrovandi, Mauro; Cianciavicchia, Domenico; and Pedrazzi, Renato, 4,702,675, Cl. 417-63.000.

Houle, Mario, to Agrimetal Inc. Apparatus for mixing animal feed materials. 4,702,609, Cl. 366-184.000.

Hounsfield, Godfrey N.; and Williams, Anthony M., to EMI Limited. Compliant coupling mechanism. 4,702,667, Cl. 414-735.000.

House Food Industrial Company Limited: *See*—
Sugisawa, Ko; Yamamoto, Masanori; and Nakanaga, Ryusuke, 4,703,149, Cl. 219-10.55E.

Houzouji, Akira: *See*—
Rokksku, Tadashi; Houzouji, Akira; Omori, Shunji; and Toto, Takayuki, 4,702,652, Cl. 409-84.000.

Howa Kogyo Kabushiki Kaisha: *See*—
Ikeda, Kouhei; Iwata, Kozo; and Masaki, Hisayoshi, 4,702,146, Cl. 89-193.000.

Howard, Jonathan M., to Audicom Corporation; and Bidco Inc. Encoding of transmitted program material. 4,703,476, Cl. 370-76.000.

Howarth, Thomas R.; Flanagan, Peter F.; Harrold, William J.; and Rodberg, Kenneth, to Raytheon Company. Permanent magnet biased magnetostrictive transducer. 4,703,464, Cl. 367-156.000.

Howland, Howard. Coated cylindrical member. 4,702,946, Cl. 428-36.000.

HRI, Inc.: *See*—
Li, Allen S.; and Eccles, Richard M., 4,702,891, Cl. 422-140.000.

Hsieh, Webert. Flash light with alarm and rescuer. 4,703,402, Cl. 362-102.000.

Huang, Fu-chih; Suh, John T.; and Skiles, Jerry W., to Rorer Pharmaceutical Corporation. Angiotensin-converting enzyme inhibitors. 4,703,037, Cl. 514-19.000.

Huang, Wann-Sheng; and Hight, Margaret A., to Texaco Inc. Patterns of horizontal and vertical wells for improving oil recovery efficiency. 4,702,314, Cl. 166-245.000.

Hubbard, David W., to Pitney Bowes Inc. Impulse ink jet print head with inclined and stacked arrays. 4,703,333, Cl. 346-140.00R.

Huck Manufacturing Company: *See*—
Kendall, James W., 4,702,655, Cl. 411-43.000.

Huegel, Irene: *See*—
Mehmert, Larry B.; and Huegel, Irene, 4,702,828, Cl. 210-131.000.

Huels Aktiengesellschaft: *See*—
Mueller, Dieter J., 4,702,809, Cl. 204-157.630.

Huffman, William A., to Minnesota Mining and Manufacturing Company. Pleochroic dyes and electro-optical displays therewith. 4,702,561, Cl. 350-349.000.

Hughes, Nathaniel, to Vortran Corporation. Aerosol producing device. 4,702,415, Cl. 239-8.000.

Hull, Michael N.: *See*—
Bhattacharjee, Shyam S.; Hull, Michael N.; and Yasnovsky, Vacheslav M., 4,702,807, Cl. 204-133.000.

Hume, Robert M., III, to H. B. Fuller Company. Book binding process involving primer adhesive containing starch. 4,702,496, Cl. 281-15.00R.

Hundertmark, James M.: *See*—
Hensel, Robert J.; Wagner, James L.; Hundertmark, James M.; Sheridan, Stephen E.; and Heidel, David W., 4,702,202, Cl. 123-52.00M.

Hunt, John F.: *See*—
Setterholm, Vance C.; and Hunt, John F., 4,702,870, Cl. 264-87.000.

Hunter Douglas Inc.: *See*—
Anderson, Richard N., 4,702,296, Cl. 160-107.000.

Hunter, Victor L.; and Fisher, Alan D., to Clarewood Pty. Ltd. Crop fingers for harvesters. 4,702,064, Cl. 56-312.000.

Huntjens, Jozef H. G., to MacIntosh N.V. Support for aiding proprioceptive innervation. 4,702,234, Cl. 128-77.000.

Husmann, Robert J.; and Healy, Lawrence R., Jr., to Omni Signal, Inc. Picket barrier and intrusion sensing system. 4,703,313, Cl. 340-550.000.

Hutcherson, David R.: *See*—
Camp, Philip G.; Macklen, Eric D.; Hole, Victor H. R.; and Hutcherson, David R., 4,702,619, Cl. 374-144.000.

Huth, Lothar; Dahm, Horst; Moetting, Goetz; and Haeberle, Fritz, to Daimler-Benz Aktiengesellschaft. Auxiliary brake light for motor vehicles. 4,703,398, Cl. 362-61.000.

Hutter, Harold G.; and Tarrant, Dennis E., to Amphenol Corporation. Shielded modular connector for use with shielded twisted pair cable. 4,702,538, Cl. 439-292.000.

Hydro-Quebec: *See*—
Auger, Jean; and Laflamme, Donald, 4,703,482, Cl. 371-16.000.

Hyperion, Inc.: *See*—
Chen, Bu S., 4,702,393, Cl. 222-1.000.

Ichida, Toshio: *See*—
Umino, Shigeru; Yamato, Koji; Kimura, Hajime; and Ichida, Toshio, 4,702,802, Cl. 204-28.000.

Ichihara, Takeo; Watanabe, Shuichi; Futami, Takashi; and Oda, Nobutaka, to Stanley Electric Co., Ltd. Head lamp for automobiles. 4,703,401, Cl. 362-80.000.

Ichikawa, Katsumi; and Kanzawa, Masahide, to Kabushiki Kaisha Kobe Seiko Sho. Mechanism for transferring cured tires from tire press to post-inflator. 4,702,669, Cl. 414-749.000.

Ichikawa, Tadashi. Underwear for men. 4,702,239, Cl. 128-159.000.

Icking, Friedrich; and Bucker, Heinrich, to Westfalia Separator AG. Device for cleaning a milking system. 4,702,197, Cl. 119-14.180.

Idec Izumi Corporation: *See*—
Araki, Mikio; Yonamine, Shigeru; and Yukawa, Kouichi, 4,702,163, Cl. 101-35.000.

Ideda, Akihiko: *See*—
Ai, Hideo; Ideda, Akihiko; and Sato, Jiro, 4,702,997, Cl. 430-325.000.

Idemitsu Kosan Company Limited: *See*—
Machara, Junichiro; Izumi, Kenzo; and Hirokawa, Ikuo, 4,703,078, Cl. 524-476.000.
Matsuo, Shigeru; Murakami, Tomoyoshi; and Takasawa, Ryuichi, 4,703,104, Cl. 528-211.000.
Tsubouchi, Toshiyuki; Minokami, Tomiyasu; and Shimizu, Nobuaki, 4,703,124, Cl. 546-352.000.

Identicator Corp.: *See*—
Martin, Timothy S.; and Arndt, Douglas C., 4,702,194, Cl. 118-31.500.

IDN Inventions and Development of Novelties ag: *See*—
Ackeret, Peter, 4,702,372, Cl. 206-387.000.

Ieki, Kouichi: *See*—
Iguma, Akira; Okuda, Tadashi; Ieki, Kouichi; and Sasamoto, Toshio, 4,702,555, Cl. 350-247.000.

Igarashi, Hisashi: *See*—
Kato, Akira; Igarashi, Hisashi; and Umeda, Tadashi, 4,702,211, Cl. 123-421.000.

Igi, Hisashi; Yamada, Tomohiro; Higuchi, Tomohisa; Ohta, Eiichi; and Yazawa, Hiroaki, to Brother Kogyo Kabushiki Kaisha. Facsimile-printer apparatus. 4,702,630, Cl. 400-82.000.

Iguchi, Yukinobu; Murakami, Kanemitsu; and Kikuchi, Masahiro, to Sony Corporation. Electron gun for a color display apparatus. 4,703,223, Cl. 313-414.000.

Iguma, Akira; Okuda, Tadashi; Ieki, Kouichi; and Sasamoto, Toshio, to Hitachi, Ltd. Optical system drive for optical recording/reproducing apparatus. 4,702,555, Cl. 350-247.000.

Iida, Tetsuo: *See*—
Odo, Satoshi; Iida, Tetsuo; Abe, Atsushi; and Tsuchida, Makoto, 4,702,201, Cl. 123-2.000.

Iida, Yasuhiro: *See*—
Imakoshi, Shigeyoshi; Suyama, Hideo; Soda, Yutaka; Fukuyama, Munekatsu; and Iida, Yasuhiro, 4,703,378, Cl. 360-113.000.

Iimura, Kyosuke. Magnet catcher for doors. 4,702,506, Cl. 292-251.500.

Ike, Kazuo: *See*—
Kawada, Hideaki; Ike, Kazuo; Nemoto, Tsuneo; and Omori, Kiyoshi, 4,703,384, Cl. 360-132.000.

Ikeda Bussan Co. Ltd.: *See*—
Izumida, Satoshi, 4,702,454, Cl. 248-585.000.

Ikeda, Kiyoshi, to NEC Corporation. Multi-direction time division multiplex communication apparatus. 4,703,479, Cl. 370-104.000.

Ikeda, Kouhei; Iwata, Kozo; and Masaki, Hisayoshi, to Howa Kogyo Kabushiki Kaisha. Gas pressure adjusting device in gas-operated auto-loading firearm. 4,702,146, Cl. 89-193.000.

Ikeda, Shigeko: *See*—
Inokuchi, Yukio; Ikeda, Shigeko; and Ito, Yoh, 4,702,780, Cl. 148-111.000.

Ikeda, Tatsufumi: *See*—
Kano, Toshio; Knodo, Masamichi; Ikeda, Tatsufumi; and Morikawa, Chiharu, 4,703,059, Cl. 514-493.000.

Ikegami, Ryoichi; and Kojima, Hitoshi, to NGK Insulators, Ltd. Infrared ray heater. 4,703,154, Cl. 219-345.000.

Ikemori, Keiji: *See*—
Kato, Masatake; Ikemori, Keiji; Tanaka, Tsunefumi; and Tanaka, Kazuo, 4,702,567, Cl. 350-427.000.

Ikenoue, Yutaka: *See*—
Takagi, Yoshiaki; Katsui, Yoshihiro; Endo, Hiroyuki; and Ikenoue, Yutaka, 4,702,771, Cl. 75-241.000.

Iknadossian, Leon. Organic car wash containing raw potato juice. 4,702,856, Cl. 252-170.000.

ILC Technology, Inc.: *See*—
Roberts, Roy D., 4,702,716, Cl. 445-26.000.

Illig, Heinz-Peter: *See*—
Gilljam, Hans N.; Chardon, Manfred; Gebald, Gregor; and Illig, Heinz-Peter, 4,702,433, Cl. 242-118.100.

Illinois Tool Works Inc.: *See*—
Wyckoff, Stephen G., 4,701,984, Cl. 24-573.000.

Imai, Eiichi; Sakashita, Kiichiro; Takagi, Seiichi; and Kukimoto, Tsutomo, to Canon Kabushiki Kaisha. Electrophotographic method uses toner of polyalkylene and non-magnetic inorganic fine powder. 4,702,986, Cl. 430-120.000.

Imai, Hiroshi: *See*—
Kasai, Junichi; Imai, Hiroshi; and Tsuda, Hiroshi, 4,703,502, Cl. 381-24.000.

Imai, Jun: *See*—
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, 4,703,227, Cl. 313-634.000.

Imai, Kazuo; Niigata, Kunihiro; Fujikura, Takashi; Hashimoto, Shinichi; and Takenaka, Toichi, to Yamanouchi Pharmaceutical Co., Ltd. Sulfamoyl substituted phenethylamine derivatives and process of producing them. 4,703,063, Cl. 514-603.000.

Imai, Yuji: *See*—
Matsuura, Toshio; Murakami, Seiro; Imai, Yuji; Ohta, Kazuya; and Tanimoto, Akikazu, 4,702,606, Cl. 356-401.000.

Imakoshi, Shigeyoshi; Suyama, Hideo; Soda, Yutaka; Fukuyama, Munekatsu; and Iida, Yasuhiro, to Sony Corporation. Magnetic transducer head utilizing magnetoresistance effect. 4,703,378, Cl. 360-113.000.

Imamura, Saburo: *See*—
Tanaka, Akinobu; Morita, Masao; Imamura, Saburo; Tamamura, Toshiaki; and Kogure, Osamu, 4,702,990, Cl. 430-197.000.

Imamura, Tatsuo; Yamamoto, Hiroyuki; and Yunoki, Yutaka, to Olympus Optical Co., Ltd. Perpendicular magnetic head. 4,703,380, Cl. 360-121.000.

Imbert, Jean-Paul, to La Bellignite. Tooling for manufacturing cages for roller bearings. 4,702,455, Cl. 249-79.000.

Immunex Corporation: *See*—
Hopp, Thomas P.; Bektesh, Susan L.; Conlon, Paul J., III; and March, Carl J., 4,703,004, Cl. 435-68.000.

ImmunoMed Corporation: *See*—
McMichael, John C., 4,702,911, Cl. 424-92.000.

Imoto, Kosuke; and Koyama, Kazutoshi, to Honda Giken Kogyo Kabushiki Kaisha. Ignition system for multi-cylinder 4 cycle engine. 4,702,222, Cl. 123-643.000.

Imperial Chemical Industries PLC: *See*—
Baxter, Anthony G. W.; Bostock, Stephen B.; and Greenwood, David, 4,703,113, Cl. 534-796.000.
Brown, James P.; May, Ronald N.; and Randall, David, 4,703,069, Cl. 521-174.000.
O'Callaghan, Patrick; and Murton, Henry R., 4,702,743, Cl. 8-527.000.

Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, to Mitsubishi Denki Kabushiki Kaisha. Motor driven scroll-type machine with cooling and lubricating structure. 4,702,681, Cl. 418-55.000.

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Inada, Koichi: *See*—
Tanaka, Masao; Watanabe, Okosu; and Inada, Koichi, 4,702,548, Cl. 350-96.150.

Inagaki, Shigemi: *See*—
Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Ito, Susumu, 4,702,665, Cl. 414-730.000.

Incoe Exp. Inc.: *See*—
Gauler, Kurt, 4,702,686, Cl. 425-190.000.

Independent Broadcasting Authority: *See*—
Flannaghan, Barry A., 4,703,358, Cl. 358-167.000.

Independent Technologies, Inc.: *See*—
Ingalsbe, David L., 4,703,497, Cl. 379-22.000.

Industrial Holographics, Inc.: *See*—
Grant, Ralph M., 4,702,594, Cl. 356-35.500.

Industrial Management Co.: *See*—
Rooklyn, Jack, 4,702,951, Cl. 428-193.000.

Infusion Systems Corporation: *See*—
Gortz, Norman, 4,702,397, Cl. 222-211.000.

Ing. C. Olivetti & C., S.p.A.: *See*—
Crotti, Alessandro; and Luc, Roberto R., 4,703,332, Cl. 346-140.00R.
Guerrini, Giampaolo; and Sommacal, Franco, 4,702,107, Cl. 73-319.000.
Vittorelli, Vittore, 4,703,504, Cl. 381-51.000.

Ingalsbe, David L., to Independent Technologies, Inc. Four pair cable test set. 4,703,497, Cl. 379-22.000.

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Ingersoll-Rand Company: *See*—
Larson, John A., 4,702,887, Cl. 420-442.000.

Ingram, Brian; Margetts, Hugh G.; and England, Michael J., to Lucas Industries Public Limited Co. Automatic adjuster. 4,702,352, Cl. 188-79.620.

Ingram, Brian; Margetts, Hugh G.; and Rees, John R., to Lucas Industries. Brake actuator. 4,702,354, Cl. 188-196.00D.

Innofinance Altalanos Innovacios Penzintezet: *See*—
Keri, Tibor; and Kristof, Janosne , 4,702,915, Cl. 424-195.100.

Innovating Training Products, Inc.: *See*—
Elstein, Rick A.; Faret, Svein; and Gazzo, John J., 4,702,475, Cl. 273-1.0GC.

Innovative Surgical Products, Inc.: *See*—
Wright, George M.; and Blake, Larry W., 4,702,733, Cl. 604-34.000.

Inokuchi, Yukio; Ikeda, Shigeko; and Ito, Yoh, to Kawasaki Steel Corporation. Process for producing a grain oriented silicon steel sheet excellent in surface properties and magnetic characteristics. 4,702,780, Cl. 148-111.000.

Inoue, Osamu; and Ohbayashi, Akira, to Victor Company of Japan, Ltd. Helical scan type magnetic tape reproducing apparatus with variable head-drum inclination capability. 4,703,370, Cl. 360-10.200.

Inoue, Tadashi; and Matsuura, Tosimi, to Omron Tateisi Electronics Co. Programmable controller. 4,703,414, Cl. 364-147.000.

Inova Microelectronics Corporation: *See*—
Varshney, Ramesh C., 4,703,436, Cl. 364-490.000.

Insituform International N.V.: *See*—
Wood, Eric, 4,701,988, Cl. 29-33.00T.

Institut National de la Sante et de la Recherche Medicale: *See*—
Mestas, Jean-Louis; and Cathignol, Dominique, 4,702,248, Cl. 128-328.000.

Institute of Gas Technology: *See*—
Marianowski, Leonard G., 4,702,973, Cl. 429-41.000.

Institutul de Cercetari Si Poriectari Pentru Petrol Si Gaze: *See*—
Stoian, Anatol; Panaitescu, Nicolita; and Tuliu, Marioara, 4,702,487, Cl. 208-390.000.

Integrated Ceilings, Inc.: *See*—
Carey, Bruce P., 4,702,056, Cl. 52-484.000.

Inter Control Hermann Kohler Elektrik GmbH & Co. KG: *See*—
Hollweck, Walter; and Eberl, Karlheinz, 4,703,301, Cl. 337-367.000.

International Business Machines Corporation: *See*—
Ahlgren, David C.; Bendernagel, Robert E.; Lange, Russell C.; and Revitz, Martin, 4,701,998, Cl. 437-31.000.
Asada, Shigeki; and Yanagisawa, Hiroshi, 4,703,364, Cl. 358-285.000.
Barker, Barbara A.; and Hernandez, Irene H., 4,703,321, Cl. 340-747.000.
Beha, Johannes G.; Dreyfus, Russell W.; Kash, Jeffrey A.; and Rubloff, Gary W., 4,703,260, Cl. 324-158.00R.
Chow, Ming-Fea; Guthrie, William L.; and Kaufman, Frank B., 4,702,792, Cl. 156-628.000.
Darringer, John A.; and Joyner, William H., Jr., 4,703,435, Cl. 364-489.000.
Irwin, John W., 4,703,420, Cl. 364-200.000.
Patel, Arvind M., 4,703,485, Cl. 371-37.000.
Spreen, James H., 4,703,409, Cl. 363-45.000.
Troupes, Demetrios; and Alexander, Randall W., 4,703,323, Cl. 340-790.000.

International Paper Company: *See*—
Bhattacharjee, Shyam S.; Hull, Michael N.; and Yasnovsky, Vacheslav M., 4,702,807, Cl. 204-133.000.
International Playtex, Inc.: *See*—
Prunesti, James; Bell, William D.; Gannaway, Jane P.; O'Boyle, Dolores; and Tedeschi, Anthony, 4,701,964, Cl. 2-406.000.
International Rectifier Corporation: *See*—
Fleischer, Kenneth H., 4,703,197, Cl. 307-646.000.
International Standard Electric Corp.: *See*—
Mohr, Friedemann, 4,702,599, Cl. 356-350.000.
Internationale Octrooi Maatschappij "Octropa" B.V.: *See*—
Wieske, Theophil; Todt, Klaus H.; and Kleibeuker, Johan F., 4,702,928, Cl. 426-607.000.
Intersil, Inc.: *See*—
Ely, Glenn L., 4,703,199, Cl. 307-264.000.
Inuishi, Masahide: *See*—
Shimano, Hiroki; Shimizu, Masahiro; Tsukamoto, Katsuhiro; and Inuishi, Masahide, 4,702,797, Cl. 156-653.000.
Inuzuka, Tsuneki: *See*—
Saito, Takashi; Nitanda, Hiroshi; Inuzuka, Tsuneki; Tokuhara, Mitsuhiro; and Honda, Haruhisa, 4,702,586, Cl. 355-3.00R.
Invernizzi, Attilio: *See*—
Magnani, Francesco; and Invernizzi, Attilio, 4,703,135, Cl. 174-135.000.
Irako, Sanae: *See*—
Kurachi, Yasuo; Arai, Katsuhiko; Wada, Hiroaki; Watabe, Yoji; and Irako, Sanae, 4,702,900, Cl. 423-345.000.
Irikura, Koji: *See*—
Okada, Hideaki; and Irikura, Koji, 4,702,120, Cl. 74-371.000.
Irvin Industries, Inc.: *See*—
Lobanoff, Mark, 4,702,519, Cl. 297-185.000.
Irwin, John W., to International Business Machines Corporation. System for arbitrating use of I/O bus by co-processor and higher priority I/O units in which co-processor automatically request bus access in anticipation of need. 4,703,420, Cl. 364-200.000.
Isenberg, Arnold O., to Westinghouse Electric Corp. Sulfur tolerant composite cermet electrodes for solid oxide electrochemical cells. 4,702,971, Cl. 429-31.000.
ISF, S.p.A.: *See*—
Pinza, Mario; Farina, Carlo; Banfi, Silvano; and Pfeiffer, Ugo, 4,703,054, Cl. 514-386.000.
Ishida, Tokuji: *See*—
Taniguchi, Nobuyuki; Omaki, Takanobu; Ishikawa, Norio; Nakai, Masaaki; Ishida, Tokuji; and Hamada, Masataka, 4,702,584, Cl. 354-400.000.
Ishihara, Naoki. Popcorn popper having improved heated air flow. 4,702,158, Cl. 99-323.500.
Ishihara, Shunichi; Saito, Keishi; Oda, Shunri; and Shimizu, Isamu, to Canon kabushiki Kaisha. Electrophotographic photosensitive member, process and apparatus for the preparation thereof. 4,702,934, Cl. 427-39.000.
Ishii, Koji, to Ryobi Ltd. Paper supplying device for perfecting printing machine. 4,702,470, Cl. 271-229.000.
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, to Hitachi, Ltd.; and Hitachi Iruma Electronic Co., Ltd. Method of assembling a light emitting device with an optical fiber. 4,702,556, Cl. 350-320.000.
Ishii, Shigeru: *See*—
Maeyama, Tsutomu; Kaneko, Kenji; and Ishii, Shigeru, 4,702,904, Cl. 424-52.000.
Ishii, Wataru; Miyazawa, Shozo; Tsuchiya, Shinji; Nakane, Hisashi; and Yokota, Akira, to Tokyo Ohka Kogyo Co., Ltd. Method of preparing photoresist material with undercoating of photoextinction agent and condensation product. 4,702,992, Cl. 430-272.000.
Ishikawa, Katsuji: *See*—
Yoshino, Tsunemi; Ishikawa, Katsuji; and Mitsui, Hajime, 4,702,583, Cl. 354-400.000.
Ishikawa, Norio: *See*—
Taniguchi, Nobuyuki; Omaki, Takanobu; Ishikawa, Norio; Nakai, Masaaki; Ishida, Tokuji; and Hamada, Masataka, 4,702,584, Cl. 354-400.000.
Ishikawa, Shozo: *See*—
Matsumoto, Masakazu; Takiguchi, Takao; Yamashita, Masataka; Umehara, Shoji; and Ishikawa, Shozo, 4,702,982, Cl. 430-72.000.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Kiga, Takashi, 4,702,180, Cl. 110-263.000.
Narisoko, Minoru; and Kiyotomo, Mikio, 4,702,177, Cl. 110-110.000.
Tsuruno, Masayoshi; and Horie, Michihiko, 4,702,019, Cl. 34-168.000.
Ishikawajima Plant Engineering Kabushiki Kaisha: *See*—
Tsuruno, Masayoshi; and Horie, Michihiko, 4,702,019, Cl. 34-168.000.
Ishimori & Co., Ltd.: *See*—
Yanagawa, Motoo, 4,702,752, Cl. 55-131.000.
Ishino, Kazuo: *See*—
Nakajima, Isamu; Nakashima, Yasuo; Miyazaki, Nobuyuki; and Ishino, Kazuo, 4,702,087, Cl. 62-285.000.
Ishiyama, Shun: *See*—
Nishida, Takao; Hiyama, Toru; Moriwaki, Kaoru; Ishiyama, Shun; and Miyamoto, Shunsuke, 4,703,257, Cl. 324-73.00R.
Ishizu, Nobuhiko: *See*—
Minami, Hirokazu; Ishizu, Nobuhiko; and Ota, Matsuo, 4,702,191, Cl. 114-106.000.
Isobe, Tomohisa: *See*—
Sagami, Yosuke; Yamamoto, Akira; Watanabe, Shoji; Isobe, Tomohisa; and Funato, Susumu, 4,703,338, Cl. 357-72.000.
Ito, Akinori; Akazawa, Michitada; and Kondo, Shiro, to Alps Electric Co., Ltd. Air conditioner control system. 4,702,307, Cl. 165-42.000.
Ito, Hideaki: *See*—
Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.
Ito, Hiroshi: *See*—
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, 4,703,227, Cl. 313-634.000.
Ito, Keishi: *See*—
Shiba, Toyoaki; Goto, Seiichi; and Ito, Keishi, 4,702,024, Cl. 37-67.000.
Ito, Keizo: *See*—
Ohtaka, Hiroshi; Kanazawa, Toshiro; Ito, Keizo; and Tsukamoto, Goro, 4,703,048, Cl. 514-255.000.
Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Copying machine that copies halves of a document on different recording medium surfaces. 4,702,589, Cl. 355-14.0SH.
Ito, Susumu: *See*—
Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Ito, Susumu, 4,702,665, Cl. 414-730.000.
Ito, Yoh: *See*—
Inokuchi, Yukio; Ikeda, Shigeko; and Ito, Yoh, 4,702,780, Cl. 148-111.000.
Itoh, Akira: *See*—
Haino, Kozo; Emoto, Kazuhiro; and Itoh, Akira, 4,702,983, Cl. 430-75.000.
Itoh, Masanori; and Hayashi, Fumihiko, to Daicel Chemical Industries, Ltd. Laser recording film. 4,702,958, Cl. 428-323.000.
Itsubo, Akira: *See*—
Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, 4,702,977, Cl. 429-194.000.
ITT Corporation: *See*—
Geiger, David J.; Lee, Sunny; and Busch, Eric, 4,702,592, Cl. 355-53.000.
ITT Industries, Inc.: *See*—
Kircher, Dieter; von Gruenber, Hubertus; and Blum, Klaus D., 4,702,531, Cl. 303-114.000.
Vatter, Waldemar; and Exner, Franz, 4,702,330, Cl. 180-6.200.
Ivanov, Ivan K.: *See*—
Bakalov, Nikolay G.; Penev, Penyo I.; Ivanov, Ivan K.; Velev, Velyo T.; Savov, Peter H.; and Vulchev, Alexander Y., 4,703,493, Cl. 373-95.000.
Ivory, Brian K. Self adjusting bag support. 4,702,445, Cl. 248-100.000.
Iwahara, Makoto: *See*—
Sakamoto, Atsushi; and Iwahara, Makoto, 4,703,506, Cl. 381-92.000.
Iwaki, Tsugishige: *See*—
Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige; and Saijo, Hideo, 4,702,872, Cl. 264-114.000.
Iwao, Nomura; Masuyama, Takayuki; Tanigawa, Yasuo; and Hasimoto, Hirofumi, to Toyota Jidosha Kabushiki Kaisha. Apparatus for opening and closing a vehicle door which is located in a line for manufacturing a vehicle. 4,702,666, Cl. 414-730.000.
Iwata, Kazuo; and Koike, Shoji, to Canon Kabushiki Kaisha. Aqueous jet-ink printing on textile fabric pre-treated with polymeric acceptor. 4,702,742, Cl. 8-495.000.
Iwata, Kozo: *See*—
Ikeda, Kouhei; Iwata, Kozo; and Masaki, Hisayoshi, 4,702,146, Cl. 89-193.000.
Iwata, Norio; Nakamura, Masao; and Takusagawa, Takashi, to Bridgestone Tire Company Limited. Heavy-duty low-section pneumatic radial tire. 4,702,293, Cl. 152-531.000.
Izard, Bernell. Seismic vibration apparatus. 4,703,463, Cl. 367-147.000.
Izuhara, Seiji: *See*—
Kitamori, Nobuyuki; Maeno, Masaya; and Izuhara, Seiji, 4,702,919, Cl. 424-480.000.
Izumi, Kenzo: *See*—
Maehara, Junichiro; Izumi, Kenzo; and Hirokawa, Ikuo, 4,703,078, Cl. 524-476.000.
Izumida, Satoshi, to Ikeda Bussan Co. Ltd. Buffer device for use to the seats of vehicles. 4,702,454, Cl. 248-585.000.
Izuta, Tadao, to Nippon Gakki Seizo Kabushiki Kaisha. Archery string. 4,702,067, Cl. 57-243.000.
Izutsu, Hitoshi; and Yamaguchi, Toshihide, to Dainippon Ink and Chemicals, Inc. Polyphenylene sulfide resin composition containing mixture of silicon compounds. 4,703,074, Cl. 524-262.000.
J. A. Green Company: *See*—
Holt, Albert C., 4,702,110, Cl. 73-573.000.
J. B. Foote Foundry Co., The: *See*—
Edwards, Douglas F., 4,702,119, Cl. 74-371.000.
J. I. Case Company: *See*—
Vater, George R., 4,702,724, Cl. 464-172.000.
J. M. Voith GmbH: *See*—
Kratzberger, Franz, 4,702,196, Cl. 118-410.000.
Jackson, Phillip B.: *See*—
Ferguson, Brian D.; and Jackson, Phillip B., 4,702,034, Cl. 47-33.000.
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, to Societe Anonyme dite: L'Oreal. Cosmetic agents based on polycationic polymers, and their use in cosmetic compositions. 4,702,906, Cl. 424-70.000.

Jaeger, Waldemar: *See*—
Holland-Letz, Guenter; Jaeger, Waldemar; Tewes, Udo; and Weigel, Peter, 4,703,162, Cl. 235-379.000.

James, David V., to Hewlett-Packard Company. Method and apparatus for performing variable length data read transactions. 4,703,418, Cl. 364-200.000.

James River Graphics, Inc.: *See*—
Hodgins, George R., 4,703,000, Cl. 430-493.000.

James, Robert; and Malka, Jacob H., to Allied Corporation. Synchro/-resolver shaft angle converter apparatus. 4,703,307, Cl. 340-347.0SY.

Jamet, Daniel: *See*—
Petit, Andre ; Penicaud, Etienne; Le Coz, Gerard; and Jamet, Daniel, 4,703,394, Cl. 361-413.000.

Janome Sewing Machine Co., Ltd.: *See*—
Hanyu, Susumu; Kasuga, Noburu; Hara, Kazumasa; and Koike, Mikio, 4,702,185, Cl. 112-254.000.

Janssen, Gwen V.; and Rowland, Roy C. Hearing aid retention device. 4,702,345, Cl. 181-129.000.

Janssen, Johannes H. H., to U.S. Philips Corporation. Brushless d.c. motor. 4,703,236, Cl. 318-254.000.

Jardin, Hans: *See*—
Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, 4,702,518, Cl. 296-217.000.

Jayko, Doreen M.: *See*—
Sommers, Dale C.; Hibberd, Frank L.; and Jayko, Doreen M., 4,702,690, Cl. 131-110.000.

Jelinek, Jerry G., to Parker Hannifin Corporation. Self centering seal. 4,702,657, Cl. 411-369.000.

Jenkins, John E.; Sperinck, John; and Buller, Michael J., to Rolls-Royce plc. Inlet particle separator. 4,702,071, Cl. 60-39.092.

Jennings, Alfred R., Jr.: *See*—
Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., 4,702,316, Cl. 166-272.000.
Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., 4,702,318, Cl. 166-274.000.

Jennings, Uel D., to Du Pont de Nemours, E. I., and Company. Process for producing high tenacity polyhexamethylene adipamide yarn having ribbon cross-section. 4,702,875, Cl. 264-177.130.

Jenny, Ernst, to BBC Brown, Boveri & Company, Limited. Process and device for operating a diesel engine with an exhaust-gas particle filter. 4,702,075, Cl. 60-274.000.

Jeol Ltd.: *See*—
Kato, Shoji, 4,703,234, Cl. 315-5.410.

Jeschke, Willi; and Pollich, Gerhard, to Heidelberger Druckmaschinen AG. Apparatus and method for aligning sheets. 4,702,469, Cl. 271-227.000.

Jeuch, Pierre, to Commissariat a l'Energie Atomique. CMOS static storage cell having noncrossing interconnection conductors. 4,703,454, Cl. 365-154.000.

Jeumont-Schneider Corporation: *See*—
Katz, Maurice; and Renard, Antoine, 4,702,356, Cl. 188-315.000.

Jidosha Kiki Co., Ltd.: *See*—
Takeshima, Sadao; and Yabe, Hideo, 4,702,334, Cl. 180-142.000.

Jobe, Patrick G.: *See*—
Solarek, Daniel B.; Jobe, Patrick G.; Tessler, Martin M.; Billmers, Robert L.; Lamb, Diane J.; and Tsai, John J., 4,703,116, Cl. 536-104.000.

Joffee, Irving B.: *See*—
Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., 4,702,840, Cl. 210-638.000.

Johanneck, Richard G. Silo chute hopper attachment. 4,702,364, Cl. 193-22.000.

John Wyeth & Brother Limited: *See*—
Crossley, Roger, 4,703,044, Cl. 514-292.000.

John Zink Company: *See*—
Ogden, Richard, 4,702,691, Cl. 431-187.000.

Johnson, Barry C.: *See*—
Mitchell, Curtis W.; and Johnson, Barry C., 4,702,941, Cl. 427-250.000.

Johnson, Bruce C.: *See*—
Prestridge, Floyd L.; and Johnson, Bruce C., 4,702,815, Cl. 204-302.000.

Johnson, Clyde R.; Hawryluk, Raymond; and Katrencik, Gerald, to Union Oil Company of California. Furnace with modular construction. 4,702,694, Cl. 432-133.000.

Johnson, D. Scott: *See*—
Johnson, Don E.; and Johnson, D. Scott, 4,702,147, Cl. 91-318.000.

Johnson, Don E.; and Johnson, D. Scott. Engine with pneumatic valve actuation. 4,702,147, Cl. 91-318.000.

Johnson, Elizabeth A.: *See*—
Connor, David T.; Cetenko, Wiaczeslaw A.; Unangst, Paul C.; and Johnson, Elizabeth A., 4,703,053, Cl. 514-382.000.

Johnson, Howard B., to Consolidated Ceramic Products, Inc. Alumina and MgO preheatable insulating refractory liners and methods of use thereof. 4,703,022, Cl. 501-95.000.

Johnson, Paul R.: *See*—
Magolda, Ronald L.; Confalone, Pasquale N.; and Johnson, Paul R., 4,702,864, Cl. 260-402.500.

Johnson, Stanley A. Doorway safety gate apparatus. 4,702,036, Cl. 49-55.000.

Jonas, Friedrich; Muller, Richard; Merten, Rudolf; and Rottmaier, Ludwig, to Bayer Aktiengesellschaft. Laminates of polyhydantoins. 4,702,953, Cl. 428-209.000.

Jones, David A., to Drackett Company, The. Vertically self supporting display package. 4,702,368, Cl. 206-45.240.

Jones, David F.: *See*—
Crupi, Joseph A.; Hayward, David J.; and Jones, David F., 4,703,416, Cl. 364-200.000.

Jones, David W.; and Elston, Malcolm, to Pilkington plc; and Salford Electrical Instruments, Limited. Window antenna/heater arrangement. 4,703,328, Cl. 343-704.000.

Jones, Michael P.; and Hahn, Paul M. Collapsible boat. 4,702,193, Cl. 114-354.000.

Joseph Zimmermann: *See*—
Gilljam, Hans N.; Chardon, Manfred; Gebald, Gregor; and Illig, Heinz-Peter, 4,702,433, Cl. 242-118.100.

Joyner, William H., Jr.: *See*—
Darringer, John A.; and Joyner, William H., Jr., 4,703,435, Cl. 364-489.000.

Jozsa, Ferencz: *See*—
Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.

Jung, Harley A.: *See*—
Herold, Gerald C.; and Jung, Harley A., 4,702,634, Cl. 401-53.000.

Junino, Alex M.: *See*—
Bugaut, Andree; and Junino, Alex M., 4,702,863, Cl. 260-396.00N.

K-Bear Athletics, Inc.: *See*—
Krueger, Dennis M., 4,702,866, Cl. 264-46.400.

Kabel-und Metallwerke Gutehoffnungshuette AG: *See*—
Gravemann, Horst, 4,702,299, Cl. 164-137.000.

Kabelschlepp GmbH: *See*—
Moritz, Werner, 4,702,281, Cl. 138-120.000.

Kabushiki Kaisha Ishida Koki Seisakusho: *See*—
Katzoka, Koichi, 4,702,394, Cl. 222-77.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Ichikawa, Katsumi; and Kanzawa, Masahide, 4,702,669, Cl. 414-749.000.

Kabushiki Kaisha Kotobuki: *See*—
Suzuki, Fumihiko, 4,702,043, Cl. 52-9.000.

Kabushiki Kaisha Meiji Gomu Kasei: *See*—
Sejimo, Akinobu; and Ono, Shigeo, 4,702,867, Cl. 264-25.000.

Kabushiki Kaisha Mihama Seisakusho: *See*—
Matsuno, Yutaka; Kumagai, Tadanobu; and Tanaka, Hatsuyuki, 4,701,982, Cl. 24-273.000.

Kabushiki Kaisha Mitaka Kogyosho: *See*—
Miyata, Toshio, 4,702,833, Cl. 210-333.010.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Orii, Makoto; and Hayashi, Katsuhiko, 4,702,350, Cl. 185-39.000.

Kabushiki Kaisha Toshiba: *See*—
Kageyama, Hiroshi; Koyama, Katsuhide; and Fujiwara, Shigemi, 4,703,178, Cl. 250-327.200.
Moriyasu, Takashi, 4,703,443, Cl. 364-559.000.
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Taketani, Mitsuhiro, 4,702,632, Cl. 400-639.100.
Watanabe, Junji, 4,702,631, Cl. 400-208.000.
Yamagami, Nobuhiko, 4,703,230, Cl. 315-364.000.
Yasuda, Kazuyuki; and Suzuki, Sigeo, 4,703,021, Cl. 501-87.000.

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Takenaka, Kenji; Suzuki, Shinichi; Kayukawa, Hiroaki; and Ohta, Masaki, 4,702,677, Cl. 417-222.000.

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Shay, Gregory D.; Devona, James E.; and Kail, James E., 4,703,080, Cl. 524-555.000.

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Kanazawa, Toshiro: *See*—
Ohtaka, Hiroshi; Kanazawa, Toshiro; Ito, Keizo; and Tsukamoto, Goro, 4,703,048, Cl. 514-255.000.

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Nakagawa, Masao, 4,703,066, Cl. 521-60.000.
Sakauchi, Takashi; Mohri, Fumihiko; Tomoda, Naohisa; and Nakatsuka, Satoshi, 4,702,852, Cl. 252-62.540.

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Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, 4,702,008, Cl. 33-1.00T.

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Maeyama, Tsutomu; Kaneko, Kenji; and Ishii, Shigeru, 4,702,904, Cl. 424-52.000.

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Ohashi, Minoru; and Kaneko, Satoshi, 4,702,999, Cl. 430-445.000.

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Okada, Hideaki; and Irikura, Koji, 4,702,120, Cl. 74-371.000.

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Ichikawa, Katsumi; and Kanzawa, Masahide, 4,702,669, Cl. 414-749.000.

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Karrer, Fritz. Method of and an apparatus for drying fibrous material. 4,702,014, Cl. 34-15.000.

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Beha, Johannes G.; Dreyfus, Russell W.; Kash, Jeffrey A.; and Rubloff, Gary W., 4,703,260, Cl. 324-158.00R.

Kashihara, Yuji: *See*—
Taga, Yutaka; Kubo, Seitoku; Kashihara, Yuji; Morisawa, Kunio; Takada, Mitsuru; and Nakamura, Yasunari, 4,702,341, Cl. 180-249.000.

Kashiwagi, Shigeru: *See*—
Maeda, Yoshihiko; Nogami, Toshiaki; Kashiwagi, Shigeru; Sakurai, Kenji; and Nishiyama, Kunio, 4,702,517, Cl. 296-214.000.

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Hanyu, Susumu; Kasuga, Noburu; Hara, Kazumasa; and Koike, Mikio, 4,702,185, Cl. 112-254.000.

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Saka, Kazuhiko; Hisano, Atsushi; Kato, Michitaka; Masaki, Toshimichi; and Nakatsuka, Nobuo, 4,703,512, Cl. 382-22.000.

Kato, Mitsutaka: *See*—
Hisano, Atushi; Yamaguchi, Yoshinori; Masaki, Toshimichi; Saka, Kazuhiko; Nakatsuka, Nobuo; and Kato, Mitsutaka, 4,703,344, Cl. 358-60.000.

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Katoh, Tomio, to TDK Corporation. Thermal reed switch assembly. 4,703,296, Cl. 335-208.000.

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Johnson, Clyde R.; Hawryluk, Raymond; and Katrencik, Gerald, 4,702,694, Cl. 432-133.000.

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Ahmad, Shamim; Lee, Zion S.; and Katrenick, Stephen E., 4,703,079, Cl. 524-495.000.

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Takagi, Yoshiaki; Katsui, Yoshihiro; Endo, Hiroyuki; and Ikenoue, Yutaka, 4,702,771, Cl. 75-241.000.

Katz, Maurice; and Renard, Antoine, to Jeumont-Schneider Corporation. Elastic compensation chamber for hydraulic energy dissipator. 4,702,356, Cl. 188-315.000.

Katzoka, Koichi, to Kabushiki Kaisha Ishida Koki Seisakusho. Dispersing supply device in automatic weighing apparatus. 4,702,394, Cl. 222-77.000.

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Chow, Ming-Fea; Guthrie, William L.; and Kaufman, Frank B., 4,702,792, Cl. 156-628.000.

Kaufman, Jack W.: *See*—
Blake, Joseph W., III; and Kaufman, Jack W., 4,702,247, Cl. 128-325.000.

Kaufman, Leon; Carlson, Joseph W.; Arakawa, Mitsuaki; McCarten, Barry M.; and Fehn, John H., to University of California, The Regents of the. Arrangement of RF coils and related method for magnetic resonance imaging of a selected inner-volume. 4,703,274, Cl. 324-318.000.

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Kawaguchi, Takeshi: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,702,339, Cl. 180-219.000.

Kawai, Akira: *See*—
Nakajima, Masayuki; Sato, Shinichi; Tokui, Akira; Kawai, Akira; Nagatomo, Masao; and Ozaki, Hiroji, 4,702,796, Cl. 156-653.000.

Kawai, Hisasi: *See*—
Tokura, Norihito; Kawai, Hisasi; Goto, Masahiro; Morino, Seiji; and Soumiya, Masato, 4,702,221, Cl. 123-606.000.

Kawai Musical Instruments Mfg. Co, Ltd: *See*—
Deutsch, Ralph, 4,702,142, Cl. 84-1.010.

Kawakami, Masaru: *See*—
Adachi, Ikuo; Hiramatsu, Yoshiharu; Ueda, Motohiko; and Kawakami, Masaru, 4,703,051, Cl. 514-291.000.

Kawamura, Masaharu: *See*—
Harada, Yoshihito; Kiuchi, Masayoshi; Kobayashi, Ryuichi; and Kawamura, Masaharu, 4,702,585, Cl. 354-410.000.

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Yamamoto, Tsuyoshi; Okada, Nobuhide; and Kawamura, Yasuo, 4,703,393, Cl. 361-405.000.

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Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.

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Inokuchi, Yukio; Ikeda, Shigeko; and Ito, Yoh, 4,702,780, Cl. 148-111.000.
Umino, Shigeru; Yamato, Koji; Kimura, Hajime; and Ichida, Toshio, 4,702,802, Cl. 204-28.000.
Kawashima, Kenichi: *See*—
Takao, Kunihiko; Kawashima, Kenichi; Nakamura, Yozo; and Kishi, Atsuo, 4,702,684, Cl. 418-259.000.
Kawauchi, Yoshikazu: *See*—
Tomii, Kaoru; Miyama, Hiroshi; Kawauchi, Yoshikazu; and Nishida, Jun, 4,703,231, Cl. 315-366.000.
Kayukawa, Hiroaki: *See*—
Takenaka, Kenji; Suzuki, Shinichi; Kayukawa, Hiroaki; and Ohta, Masaki, 4,702,677, Cl. 417-222.000.
Kazda, Stanislav: *See*—
Garthoff, Bernward; Kazda, Stanislav; and Knorr, Andreas, 4,703,038, Cl. 514-19.000.
KB Denver, Inc.: *See*—
Dunlap, Bill D., 4,703,139, Cl. 200-76.000.
Keating, Kenneth P.: *See*—
Marquis, Edward T.; Sanderson, John R.; and Keating, Kenneth P., 4,703,027, Cl. 502-171.000.
Keefer, Bowie G. Method and apparatus for gas separation and synthesis. 4,702,903, Cl. 423-359.000.
Kehl, Georg; and Schafer, Ernst-Dieter, to Robert Bosch GmbH. Ball-and-socket joint assembly tool and method. 4,701,990, Cl. 29-441.00R.
Kelley, Anthony D.; Finley, James W.; Eachus, Vernon F.; Lim, Richard A.; and Yano, Miles K., to United States of America, Navy. Support for thermally expanding conical heatshield. 4,702,439, Cl. 244-158.00A.
Kelley, Bruce G.: *See*—
Love, Paul M.; and Kelley, Bruce G., 4,702,766, Cl. 75-34.000.
Kells Medical, Incorporated: *See*—
Sheehan, Joseph C. M., 4,702,251, Cl. 128-335.000.
Kelner, Robert. Package assembly with testing feature for illuminated product. 4,702,374, Cl. 206-418.000.
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Rozmus, Walter J., 4,702,357, Cl. 188-79.5GC.
Kempster, Roger B., to Allen Coding Machines Limited. Infinitely variable ratio drive mechanism. 4,702,428, Cl. 242-67.200.
Kendall Company, The: *See*—
Bates, David A., 4,702,740, Cl. 604-323.000.
Kendall, James W., to Huck Manufacturing Company. Fastening system including an improved interference fit blind fastener and method of manufacture. 4,702,655, Cl. 411-43.000.
Kendrick, Billy J. Quick release jack. 4,702,458, Cl. 254-97.000.
Kent, Randy K., to Romac Industries Inc. Corrosion resistant nickel alloyed ductile cast iron of ferrite structure. 4,702,886, Cl. 420-18.000.
Kenyon, William E.; Baker, Paul L.; Sen, Pabitra N.; and Banavar, Jayanth R., to Schlumberger Technology Corp. Method and apparatus for obtaining properties of subsurface formations from textural models derived from formation parameters. 4,703,277, Cl. 324-323.000.
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Naoumidis, Aristides; Neumeister, Herbert; Schirbach, Arno; Struck, Bernd D.; and Triefenbach, Dieter, 4,702,784, Cl. 156-89.000.
Kernforschungszentrum Karlsruhe GmbH: *See*—
Koester, Rainer; Smailos, Emanuel; Schwarzkopf, Werner; and Kiesow, Arthur, 4,702,391, Cl. 220-456.000.
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Barczak, Virgil J.; Baldwin, Roger A.; and Graham, Paul R., 4,702,899, Cl. 423-244.000.
Kerr, Thomas W.: *See*—
Levy, Robert S.; and Kerr, Thomas W., 4,702,438, Cl. 244-104.0FP.
Kerrom, Roger, to Hilti Aktiengesellschaft. Expansion bolt assembly. 4,702,656, Cl. 411-60.000.
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Konig, Gerhard; Fleck, Karl; Kess, Herbert; and Weigand, Artur, 4,701,974, Cl. 15-323.000.
Khader, Mahmoud M.; and Lichtin, Norman N., to Boston University, Trustees of. Partially reduced ferric oxide catalyst for the making of ammonia via the photoassisted reduction of molecular nitrogen and method for the preparation of the catalyst. 4,703,030, Cl. 502-338.000.
Kiefer, Rudolf: *See*—
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.
Kielhorn, Gerhard. Internal combustion engine. 4,702,072, Cl. 60-39.390.
Kiernan, Michael A.: *See*—
Mitchell, Robert L.; and Kiernan, Michael A., 4,702,905, Cl. 424-57.000.
Kiesow, Arthur: *See*—
Koester, Rainer; Smailos, Emanuel; Schwarzkopf, Werner; and Kiesow, Arthur, 4,702,391, Cl. 220-456.000.
Kiga, Takashi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Pulverized coal burner device. 4,702,180, Cl. 110-263.000.
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Takata, Yatsuka; Yamada, Tadamasa; and Kikuchi, Eiki, 4,702,767, Cl. 75-49.000.
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Iguchi, Yukinobu; Murakami, Kanemitsu; and Kikuchi, Masahiro, 4,703,223, Cl. 313-414.000.
Kim, Tai K.: *See*—
Cheresnowsky, Michael J.; Brunelli, Timothy A.; and Kim, Tai K., 4,702,895, Cl. 423-54.000.
Kimura, Hajime: *See*—
Umino, Shigeru; Yamato, Koji; Kimura, Hajime; and Ichida, Toshio, 4,702,802, Cl. 204-28.000.
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Kimura, Tadashi: *See*—
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Nakanori, Takayuki; Kimura, Tomoaki; and Nishino, Tadashi, 4,702,300, Cl. 164-154.000.
Kinameri, Kanji, to Hitachi, Ltd. Three-dimensional structure viewer and method of viewing three-dimensional structure. 4,702,607, Cl. 356-432.000.
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Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, 4,702,008, Cl. 33-1.00T.
Kinderov, Petr A.; Volkov, Nikolai S.; Vasilieva, Natalia V.; and Malashkina, Regina T., to Nauchno-Issledovatelsky Institut Kabelnoi Promyshlennosti Po "Sredazkabel" . Current-conducting composition. 4,702,860, Cl. 252-511.000.
King, Lloyd H., Sr. Dispersal member. 4,702,270, Cl. 137-268.000.
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Endo, Shyusuke; Aoyama, Naofumi; Yabuuchi, Toshihiko; Sakuma, Toshiyuki; and Kinugawa, Kiyoshige, 4,702,560, Cl. 350-333.000.
Kioritz Corporation: *See*—
Nagashima, Akira, 4,702,139, Cl. 83-830.000.
Satoh, Masatoshi; and Akaike, Junichi, 4,702,063, Cl. 56-202.000.
Kira, Tohru: *See*—
Nakamura, Tsuneo; Yamasaki, Hidenori; Kira, Tohru; and Yoshikawa, Mitsuhiko, 4,702,794, Cl. 156-643.000.
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Kiren-Amgen, Inc.: *See*—
Lin, Fu-Kuen, 4,703,008, Cl. 435-240.200.
Kirk, Clair F.: *See*—
Kirk, Samuel A.; Kirk, Clair F.; Kirk, John W.; and Kirk, Douglas J., 4,702,893, Cl. 422-173.000.
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Kirk, Samuel A.; Kirk, Clair F.; Kirk, John W.; and Kirk, Douglas J., 4,702,893, Cl. 422-173.000.
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Takao, Kunihiko; Kawashima, Kenichi; Nakamura, Yozo; and Kishi, Atsuo, 4,702,684, Cl. 418-259.000.
Kishi, Hajimu; Seki, Masaki; Takegahara, Takashi; and Onishi, Yasushi, to Fanuc Ltd. Method of approach in area cutting. 4,703,415, Cl. 364-170.000.
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Kishima, Masayoshi: *See*—
Hori, Yasuaki; and Kishima, Masayoshi, 4,701,977, Cl. 16-266.000.
Kistner, Herbert: *See*—
Frischmann, Albert; Rieger, Johannes; Mermi, Kurt; Kistner, Herbert; and Zimmermann, E. Harald, 4,702,654, Cl. 411-31.000.
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Fujii, Kunihisa; Tomono, Noboru; Kito, Tetsuo; and Yoshino, Kosei, 4,703,295, Cl. 335-129.000.
Kitz Corporation: *See*—
Kaji, Shoichi, 4,702,150, Cl. 92-128.000.
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Yasuoka, Akimasa; and Kiuchi, Takeo, 4,702,210, Cl. 123-339.000.
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Narisoko, Minoru; and Kiyotomo, Mikio, 4,702,177, Cl. 110-110.000.
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Baasner, Bernd; and Klauke, Erich, 4,703,121, Cl. 544-317.000.
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Fritz, Ernst, 4,702,462, Cl. 266-225.000.
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Andres, Rudolf; Knoll, Heinz; Petri, Volker; and Pfistner, Harald, 4,702,492, Cl. 280-801.000.
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Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige; and Saijo, Hideo, 4,702,872, Cl. 264-114.000.
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Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,681, Cl. 418-55.000.
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Nakano, Yuji; Kamiyama, Kazushi; and Kobayashi, Tatuo, 4,703,020, Cl. 501-86.000.
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Tesmann, Holger; Blum, Helmut; and Koester, Rita, 4,702,823, Cl. 209-156.000.
Kogure, Osamu: *See*—
Tanaka, Akinobu; Morita, Masao; Imamura, Saburo; Tamamura, Toshiaki; and Kogure, Osamu, 4,702,990, Cl. 430-197.000.
Kohama, Tokio: *See*—
Nakayama, Toshiaki; Kohama, Tokio; Okada, Isamu; and Yokoyama, Tamio, 4,702,940, Cl. 427-244.000.
Koike, Mikio: *See*—
Hanyu, Susumu; Kasuga, Noburu; Hara, Kazumasa; and Koike, Mikio, 4,702,185, Cl. 112-254.000.
Koike, Shoji: *See*—
Iwata, Kazuo; and Koike, Shoji, 4,702,742, Cl. 8-495.000.
Kojima, Hitoshi: *See*—
Ikegami, Ryoichi; and Kojima, Hitoshi, 4,703,154, Cl. 219-345.000.
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Otomura, Satoshi; and Kojima, Narihito, 4,702,979, Cl. 430-52.000.
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Mimura, Yoshinori; and Nagao, Yasuyuki, 4,702,791, Cl. 156-614.000.
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Tsutsumi, Sunsaku; and Ozawa, Takurou, 4,702,117, Cl. 74-89.170.
Kolb, Erich: *See*—
Wiesenberger, Alfred; Schildmann, Jens A.; Kolb, Erich; and Dechent, Hans-Mario, 4,702,922, Cl. 426-51.000.
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Wolff, Joachim; Koll, Jochen; Wolf, Karlheinz; Klipper, Reinhold M.; and Lange, Peter M., 4,702,744, Cl. 8-527.000.
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Ettelman, David J.; and Floresta, John G., 4,703,243, Cl. 318-696.000.
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Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.
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Hatabe, Yukio; and Komatsubara, Shoji, 4,702,588, Cl. 355-10.000.
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Goto, Makoto; Ohbe, Takao; and Komori, Akihiro, 4,703,144, Cl. 219-69.00P.
Komura, Osamu: *See*—
Higuchi, Matsuo; Komura, Osamu; and Kamijo, Eiji, 4,702,869, Cl. 264-65.000.
Kondo, Shiro: *See*—
Ito, Akinori; Akazawa, Michitada; and Kondo, Shiro, 4,702,307, Cl. 165-42.000.
Kondo, Tetsujiro, to Sony Corporation. Apparatus for an efficient coding of television signals. 4,703,351, Cl. 358-135.000.
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Fukuchi, Masakazu; and Haneda, Satoshi, 4,702,987, Cl. 430-122.000.
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Konno, Yoshikiyo, to Pioneer Electronic Corporation. Device and method for controlling movement of focusing lens for optical disk reading apparatus. 4,703,466, Cl. 369-45.000.

Konta, Yukio; and Yoneda, Yosuke, to Tomy Kogyo Co. Inc. Trick vehicle capable of jumping. 4,702,720, Cl. 446-448.000.

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Koseki, Ryoji, to Amada Engineering & Service Co., Inc. Device for suppressing electrical discharges between cathodes of laser oscillator. 4,703,487, Cl. 372-33.000.

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Saito, Taiji; and Kotani, Akira, 4,702,079, Cl. 60-599.000.

Kotlyar, Oleg, to Eastman Christensen Co. Universal mud pulse telemetry system. 4,703,461, Cl. 367-83.000.

Kouno, Katsumi; and Sawada, Daisaku, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control system for continuously variable transmission. 4,702,725, Cl. 474-28.000.

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Kowalski, Ronald C.: *See*—
Gardner, Irwin J.; Fusco, James V.; Newman, Neil F.; Kowalski, Ronald C.; Davis, William M.; and Baldwin, Francis P., 4,703,091, Cl. 525-332.300.

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Kageyama, Hiroshi; Koyama, Katsuhide; and Fujiwara, Shigemi, 4,703,178, Cl. 250-327.200.

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Imoto, Kosuke; and Koyama, Kazutoshi, 4,702,222, Cl. 123-643.000.

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Takata, Yatsuka; Yamada, Tadamasa; and Kikuchi, Eiki, 4,702,767, Cl. 75-49.000.

Koziol, Jeffrey E.; and Peyman, Gholam. Method of forming an intraocular lens. 4,702,865, Cl. 264-17.000.

Kraft, Inc.: *See*—
Bozinovich, Matthew J.; and Fontana, Robert M., 4,702,389, Cl. 220-306.000.

Kraft, Kenneth N.: *See*—
Tredwell, Gilman; Kraft, Kenneth N.; and Ampon, Felix A., 4,702,174, Cl. 104-172.200.

Kramer, Carolyn M., to Braun Aktiengesellschaft. Fabric pressing device. 4,702,933, Cl. 427-34.000.

Kramer, Dean C., to Martinson Manufacturing Company, Inc. Quick disconnect for sewage system. 4,702,274, Cl. 137-515.500.

Kraschnewski, Melvin W.: *See*—
Mork, Phillip W.; Kraschnewski, Melvin W.; and Gilmore, Carl D., 4,702,524, Cl. 299-64.000.

Kratzberger, Franz, to J. M. Voith GmbH. Coating device. 4,702,196, Cl. 118-410.000.

Kraus, Bernd: *See*—
Swann, Peter R.; and Kraus, Bernd, 4,703,181, Cl. 250-442.100.

Kraus, Charles E., to Excelermatic Inc. Hydraulically controlled infinitely variable traction roller transmission. 4,702,118, Cl. 74-200.000.

Krause, Charles A.; Rajaram, Babu; and Watzman, Barry A., to Zenith Electronics Corporation. Switchcover means and method for dual mode microprocessor system. 4,703,419, Cl. 364-200.000.

Krautkramer, Hermann. Gas spring. 4,702,463, Cl. 267-64.260.

Kraynak, Francis. Safety device for bureau drawers, cabinet doors and the like. 4,702,536, Cl. 312-330.00R.

Krenn, Karl-Dieter: *See*—
Fischer, Wolfgang; and Krenn, Karl-Dieter, 4,703,014, Cl. 436-42.000.

Krenzel, Ronald L. Sewn polyolefin and fabric bag and method of making bag. 4,703,519, Cl. 383-97.000.

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Keri, Tibor; and Kristof, Janosne , 4,702,915, Cl. 424-195.100.

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Krohn, David A., to Eotec Corporation. Precision optoelectronic rotational position sensor. 4,703,309, Cl. 340-347.00P.

Kroneis, Herbert; and Offenbacher, Helmut, to AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof.Dr.Dr.h.c. Hans List. Arrangement for fluorescence-optical measurement of concentrations of substances contained in a sample. 4,703,182, Cl. 250-458.100.

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Krueger, Dennis M., to K-Bear Athletics, Inc. Method of making an expanded ball batting aid. 4,702,866, Cl. 264-46.400.

Kruse, Charles F. Collapsible goal frame. 4,702,478, Cl. 273-127.00B.

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Tokumaru, Sennosuke; Kubo, Michinori; and Nogami, Mari, 4,702,923, Cl. 426-61.000.

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Sasai, Yoichi; and Kubo, Minoru, 4,702,781, Cl. 437-129.000.

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Nakamura, Shinya; Kubo, Seitoku; and Taga, Yutaka, 4,702,083, Cl. 60-721.000.
Taga, Yutaka; Kubo, Seitoku; Kashihara, Yuji; Morisawa, Kunio; Takada, Mitsuru; and Nakamura, Yasunari, 4,702,341, Cl. 180-249.000.

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Kinoshita, Toshiyuki; Arai, Toshiaki; Sato, Takao; Kubo, Takashige; Yoshizawa, Yasufumi; and Mori, Hiromichi, 4,703,422, Cl. 364-200.000.

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Sekiguchi, Yoshishige; and Kubota, Tomiyasu, 4,703,492, Cl. 373-91.000.

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Elliott, Franklin E.; and Kudishevich, Anatoly, 4,703,406, Cl. 362-365.000.

Kugler, Reinhard: *See*—
Bohnen, Peter; Godesa, Ludvik; Kugler, Reinhard; and Marquardt, Ulrich, 4,703,137, Cl. 200-50.0AA.

Kuhl, Henry Y. Method and apparatus for high capacity washing, sanitizing and drying of stacks of flats. 4,702,777, Cl. 134-25.300.

Kuhnemundt, Gerhard; and Elsasser, Heinz, to Marguardt GmbH. Switching arrangement for full-wave power control which is insensitive to mains voltage fluctuations. 4,703,248, Cl. 323-300.000.

Kukimoto, Tsutomo: *See*—
Imai, Eiichi; Sakashita, Kiichiro; Takagi, Seiichi; and Kukimoto, Tsutomo, 4,702,986, Cl. 430-120.000.

Kull, Martin: *See*—
Salour, Michael M.; Schoner, Gerhard; Bechtel, James H.; and Kull, Martin, 4,703,175, Cl. 250-227.000.

Kulp, Jonathan B.: *See*—
Cage, Jerry L.; and Kulp, Jonathan B., 4,702,335, Cl. 180-142.000.

Kumagai, Masao: *See*—
Enomoto, Hiromu; Yasuda, Yasushi; Tahara, Akinori; and Kumagai, Masao, 4,703,202, Cl. 307-443.000.

Kumagai, Tadanobu: *See*—
Matsuno, Yutaka; Kumagai, Tadanobu; and Tanaka, Hatsuyuki, 4,701,982, Cl. 24-273.000.

Kumasaki, Toshimi: *See*—
Tanaka, Hiroyuki; Takami, Eiichi; Mishima, Kyoichi; Higashi, Mitsunobu; and Kumasaki, Toshimi, 4,702,729, Cl. 474-205.000.

Kumazawa, Kiyotake; Minamide, Noriaki; Moribe, Yoshihiro; Takahashi, Mikio; Beppu, Osamu; and Mitamura, Masahiro, to Hitachi, Ltd. Control method and apparatus for positioning servo system. 4,703,242, Cl. 318-685.000.

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Sato, Atsushige; Miura, Ishi; Kumei, Yasuhiro; Okuno, Osamu; Nakano, Tsuyoshi; and Yoshida, Bunsaku, 4,702,765, Cl. 75-0.50B.

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Segal, Marcos; and Kunze, Michael, 4,703,111, Cl. 534-637.000.

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Kameyama, Tsutomu; Kitamura, Jiro; Takigawa, Tetsuo; and Mizuno, Masao, 4,703,061, Cl. 514-551.000.

Kureha Ltd.: *See*—
Nakayama, Toshiaki; Kohama, Tokio; Okada, Isamu; and Yokoyama, Tamio, 4,702,940, Cl. 427-244.000.

Kurematsu, Katsumi: *See*—
Tsuda, Tadayuki; and Kurematsu, Katsumi, 4,702,591, Cl. 355-15.000.

Kurihara, Makoto: *See*—
Miyauchi, Yukio; Nakagawa, Yuichi; Kurihara, Makoto; and Hayashi, Norifumi, 4,702,939, Cl. 42-195.000.

Kurihara, Takashi: *See*—
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, 4,703,106, Cl. 530-307.000.

Kurkjian, Andrew L.; Chang, Shu-Kong; and Everhart, Ann H., to Schlumberger Technology Corporation. Method and apparatus for acoustic dipole direct shear wave well logging. 4,703,460, Cl. 367-31.000.

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Odani, Yusuke; Akechi, Kiyoaki; and Kuroishi, Nobuhito, 4,702,885, Cl. 419-23.000.

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Fukuda, Tamotsu; Shigeta, Shiro; Okuya, Hiroaki; Kuroiwa, Yasuyuki; and Sudo, Tadashi, 4,702,910, Cl. 424-92.000.

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Seifert, Josef, 4,702,533, Cl. 312-12.000.

Kussel, Willy; Dettmers, Michael; and Weirich, Walter, to Gewerkschaft Eisenhutte Westfalia GmbH. Control of the actuation of hydraulic consumers. 4,702,148, Cl. 91-527.000.

Kusuma, Djuanarto-Adi: *See*—
Hildebrand, Reinhard; and Kusuma, Djuanarto-Adi, 4,702,155, Cl. 98-2.000.

Kuwana, Kazutaka: *See*—
Hirao, Kouji; Kuwana, Kazutaka; and Asami, Ken, 4,702,123, Cl. 74-526.000.

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stripline circulator and method for fabricating same. 4,703,289, Cl. 333-1.100.

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Arita, Hirotaka, 4,703,169, Cl. 250-211.00J.
Nakano, Yuji; Kamiyama, Kazushi; and Kobayashi, Tatuo, 4,703,020, Cl. 501-86.000.

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Yoshikawa, Kiyoshi; Toku, Hisayuki; Ueda, Makoto; and Tamagaki, Hiroshi, 4,703,222, Cl. 313-362.100.

La Bellignite: *See*—
Imbert, Jean-Paul, 4,702,455, Cl. 249-79.000.

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Bouteille, Daniel; Nicolas, Michel; and Prudhomme, Pierre, 4,702,276, Cl. 137-580.000.

Lacey, Raymond D.: *See*—
Bradley, William D.; Alvi, Zia R.; and Lacey, Raymond D., 4,701,993, Cl. 29-523.000.

Laflamme, Donald: *See*—
Auger, Jean; and Laflamme, Donald, 4,703,482, Cl. 371-16.000.

L'Air Liquide: *See*—
Madsac, Michel; and Mauvoisin, Rene , 4,702,779, Cl. 148-16.600.

Laird, Kevin M.: *See*—
Rozanski, Walter J., Jr.; and Laird, Kevin M., 4,703,520, Cl. 455-75.000.

Lake, David E., Jr., to Grass Valley Group, Inc., The. Mixer controlled variable passband finite impulse response filter. 4,703,447, Cl. 364-724.000.

Lakin, David F.: *See*—
Best, Christopher H.; Lakin, David F.; and Simpkins, Timothy M., 4,702,212, Cl. 123-472.000.

Lamarche, Paul E., to Borg-Warner Automotive, Inc. Long travel damper with low lag dynamic spring retainers. 4,702,721, Cl. 464-67.000.

Lamb, Archie C.: *See*—
Anderson, John C.; Davies, Morris J.; and Lamb, Archie C., 4,703,174, Cl. 250-227.000.

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Gravenstein, Joachim S.; and Lampotang, Samsun, 4,702,241, Cl. 128-204.250.

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Glover, Roy A.; Coyle, Peter; and Lee, Denis C., 4,702,701, Cl. 434-270.000.

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Westall, Frederick A.; Lee, Dominic S.; Cameron, Ian R.; and McLintock, Robert W., 4,703,480, Cl. 370-111.000.

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Geiger, David J.; Lee, Sunny; and Busch, Eric, 4,702,592, Cl. 355-53.000.

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Ahmad, Shamim; Lee, Zion S.; and Katrenick, Stephen E., 4,703,079, Cl. 524-495.000.

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Ulveling, Leon; Schmit, Louis; and Legille, Edouard, 4,702,288, Cl. 141-67.000.

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Benner, Harold T., Jr.; Leonhardt, Mark A.; and Zdinak, Matthew J., 4,702,289, Cl. 141-125.000.

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Kolbe, William F.; and Leskovar, Branko, 4,703,273, Cl. 324-314.000.

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Heideman, Torsten; Levander, Kai; and Salmi, Pekka, 4,702,187, Cl. 114-40.000.

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Levine, Richard M.; Levine, Stuart H.; and Levine, Leon, 4,702,100, Cl. 72-404.000.

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Ovil, Yoel; and Levy, Morris, 4,702,250, Cl. 128-334.00R.

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Dighton, Gaylon L.; and Lewis, John W., 4,702,009, Cl. 33-126.600.

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Herrington, Richard A.; Kleman, Thomas G.; and Apolinar, Ermelinda A., 4,702,042, Cl. 51-321.000.
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Matlock, Dyer A.; Lichtel, Richard L., Jr.; and Pearce, Lawrence G., 4,702,000, Cl. 437-63.000.
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Khader, Mahmoud M.; and Lichtin, Norman N., 4,703,030, Cl. 502-338.000.
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Lin Tec Verpackungstechnik GmbH: *See*—
Grone, Horst D., 4,702,377, Cl. 206-557.000.
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Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang-i, 4,703,115, Cl. 536-55.000.
Lindauer Dornier Gesellschaft mbH: *See*—
Gehring, Fritz, 4,702,284, Cl. 139-446.000.
Linde Aktiengesellschaft: *See*—
Becker, Hans, 4,702,750, Cl. 55-48.000.
Linden, Joseph: *See*—
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Maeyama, Tsutomu; Kaneko, Kenji; and Ishii, Shigeru, 4,702,904, Cl. 424-52.000.
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Lisiecki, Robert E., to Ex-Cell-O Corporation. Flat top container and blank for constructing same. 4,702,407, Cl. 206-624.000.
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Handrich, Eberhard; and Schroder, Werner, 4,702,600, Cl. 356-350.000.
Hassenpflug, Wolfgang; and Schwable, Rainer, 4,702,106, Cl. 73-181.000.
Schroder, Werner, 4,702,601, Cl. 356-350.000.
Littau, Eugene G. Belted crop-collecting and conveyor system. 4,702,065, Cl. 56-329.000.
Littelfuse-Tracor B.V.: *See*—
Vermij, Leendert, 4,703,299, Cl. 337-158.000.
Lobanoff, Mark, to Irvin Industries, Inc. Vanity mirror. 4,702,519, Cl. 297-185.000.
Lockheed Missiles & Space Company, Inc.: *See*—
Mercado, Romeo I.; and Robb, Paul N., 4,702,569, Cl. 350-479.000.
Locko, George A.; and Frihart, Charles R., to Union Camp Corporation. Silicone rubber containment of organic liquids. 4,703,070, Cl. 523-102.000.
Loeffler, Wilfried; and Oppelt, Arnulf, to Siemens Aktiengesellschaft. NMR tomographic apparatus. 4,703,271, Cl. 324-309.000.
Logan, Ralph A.: *See*—
Dolan, Gerald J.; Logan, Ralph A.; Temkin, Henryk; and Wilt, Daniel P., 4,701,995, Cl. 437-129.000.
LoJacono, Francis X.; and Roberts, Janet S. Support bracket. 4,702,448, Cl. 248-231.700.
Lombard, Claude; Brisset, Jean-Paul; Marais, Jean-Luc; and Catier, Gerard, to Regie Nationale des Usines Renault. Device for electrical actuation of the accelerator of an internal combustion engine. 4,702,208, Cl. 123-339.000.
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Long, Peter G.: *See*—
Ellis, Cedric R.; Long, Peter G.; Marshman, Christopher A.; and Gillery, David J., 4,702,246, Cl. 128-303.100.
Longman, Robert J.: *See*—
Pettigrew, Robert M.; Gardner, Keith; and Longman, Robert J., 4,703,469, Cl. 369-101.000.
Lonza Ltd.: *See*—
Hardt, Peter, 4,703,126, Cl. 548-508.000.
Lord, Gary E.; Metzler, Robert M.; and Wirth, David D., to Eli Lilly and Company. Synthesis of 3-iodomethyl cephalosporins. 4,703,118, Cl. 540-224.000.
L'Oreal: *See*—
Bugaut, Andree; and Junino, Alex M., 4,702,863, Cl. 260-396.00N.
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Giehl, Klaus-Ulrich, 4,702,271, Cl. 137-389.000.
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Louderback, Allan L.; and Szatkowski, Paul R. Urobilinogen control. 4,703,013, Cl. 436-12.000.
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Villarejos, Victor M.; and Visona, Kirsten A., 4,702,909, Cl. 424-89.000.
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Nappholz, Tibor A.; Lubin, Mark; and Valenta, Harry L., Jr., 4,702,253, Cl. 128-419.0PG.
Luc, Roberto R.: *See*—
Crotti, Alessandro; and Luc, Roberto R., 4,703,332, Cl. 346-140.00R.
Lucas Industries: *See*—
Ingram, Brian; Margetts, Hugh G.; and Rees, John R., 4,702,354, Cl. 188-196.00D.
Lilley, Eric M.; and Parker, David J., 4,702,077, Cl. 60-578.000.
Lucas Industries Public Limited Company: *See*—
Anderson, Robert A., 4,702,532, Cl. 303-115.000.
Best, Christopher H.; Lakin, David F.; and Simpkins, Timothy M., 4,702,212, Cl. 123-472.000.
Briggs, Stuart J.; Parker, David J.; and Schluter, Peter, 4,702,078, Cl. 60-585.000.
Ingram, Brian; Margetts, Hugh G.; and England, Michael J., 4,702,352, Cl. 188-79.620.
Price, Anthony G.; and Campbell, Roy, 4,702,351, Cl. 188-71.400.
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Luchsinger, Pedro W.: *See*—
Pagliai, Ferro D.; and Luchsinger, Pedro W., 4,702,416, Cl. 239-11.000.
Lukens, J. Paul, Jr., to Phillocraft Company. Air-equipped table. 4,702,664, Cl. 414-676.000.
Lundell, Ulf: *See*—
Broddner, Sven M.; Bromster, Leif; Lundell, Ulf; and Pilenvik, Goran S., 4,702,242, Cl. 128-205.130.
L'Universite du Quebec a Trois-Rivieres: *See*—
Achtermann, Jurgen H.; Bose, Tapan K.; and St-Arnaud, Jean-Marie, 4,702,604, Cl. 356-361.000.
Lustig, Lee M.: *See*—
Greenlee, Donald R.; and Lustig, Lee M., 4,702,313, Cl. 166-216.000.
Luther, Ronald B.; Snyder, Daniel R.; and Whitehouse, Craig M., to DRS Infusion Systems, Inc. Assembly of breakaway needle and catheter. 4,702,735, Cl. 604-161.000.
Lutz, Alfons: *See*—
Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, 4,702,518, Cl. 296-217.000.
Lyall, Raymond M.: *See*—
Terranova, Victor P.; Wikesjo, Ulf M. E.; Genco, Robert J.; Hic, Susanne; and Lyall, Raymond M., 4,702,734, Cl. 604-54.000.
Lycab AB: *See*—
Beele, Johannes A., 4,702,444, Cl. 248-56.000.
Lyle, Terry A.: *See*—
Freidinger, Roger; Nutt, Ruth F.; Lyle, Terry A.; and Saperstein, Richard, 4,703,034, Cl. 514-11.000.
Lyons, Michael R.: *See*—
Cureton, John E.; and Lyons, Michael R., 4,702,070, Cl. 60-39.070.
M & M Displays: *See*—
Mace, Vincent, 4,702,025, Cl. 40-156.000.
M. W. Kellogg Company, The: *See*—
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., 4,702,819, Cl. 208-354.000.
Maag Gear-Wheel and Machine Company Limited: *See*—
Berchtold, Nikolaus, 4,703,261, Cl. 324-207.000.
Maatman, Hendrik: *See*—
Ebregt, Johan L.; and Maatman, Hendrik, 4,702,876, Cl. 264-184.000.
Maccini, John A.: *See*—
Rendulic, Francis J.; Robinson, Randolph H.; and Maccini, John A., 4,702,994, Cl. 430-306.000.
Mace, Vincent, to M & M Displays. Display frame. 4,702,025, Cl. 40-156.000.
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MacIntosh N.V.: *See*—
Huntjens, Jozef H. G., 4,702,234, Cl. 128-77.000.
Mack, Raymond: *See*—
Ulveing, Leon; Linden, Joseph; Bohnet, Matthias; Wies, Georges; and Mack, Raymond, 4,702,182, Cl. 110-347.000.
Mackey, Joseph E.: *See*—
Wilson, George S.; Kline, Harvey E.; and Mackey, Joseph E., 4,702,956, Cl. 428-251.000.
Macklen, Eric D.: *See*—
Camp, Philip G.; Macklen, Eric D.; Hole, Victor H. R.; and Hutcherson, David R., 4,702,619, Cl. 374-144.000.
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Madan, Arun: *See*—
Ovshinsky, Stanford R.; and Madan, Arun, 4,703,336, Cl. 357-30.000.
Madsac, Michel; and Mauvoisin, Rene , to L'Air Liquide. Heat process for producing corrosion resistant steel articles. 4,702,779, Cl. 148-16.600.
Maeda, Kazuo; Tokumasu, Noboru; and Fukuyama, Toshihiko, to Applied Materials Japan, Inc. Gas-phase growth process. 4,702,936, Cl. 427-54.100.
Maeda, Yoichiro: *See*—
Hagihara, Siro; Tsutani, Sadahiro; and Maeda, Yoichiro, 4,702,331, Cl. 180-9.320.

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Kitamori, Nobuyuki; Maeno, Masaya; and Izuhara, Seiji, 4,702,919, Cl. 424-480.000.

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Schiffert, Phillip W., 4,703,263, Cl. 324-216.000.

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Magnetic Controls Company: *See*—
Vachhani, Vasantrai A.; and Bodimer, Gilbert D., 4,702,544, Cl. 439-395.000.

Magolda, Ronald L.; Confalone, Pasquale N.; and Johnson, Paul R., to Du Pont de Nemours, E. I., and Company. Analogs of platelet activating factor. 4,702,864, Cl. 260-402.500.

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Maistore S.p.A.: *See*—
Citterio, Paolo, 4,702,426, Cl. 241-167.000.

Majchrzak, Roland: *See*—
Ebert, Charles; Delcroix, Jean L.; Majchrzak, Roland; and Viertel, Lothar, 4,702,513, Cl. 296-97.00H.

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Oyamoto, Toshiya; Makino, Katsuaki; and Ogawara, Fumio, 4,702,818, Cl. 208-81.000.

Makino, Masahiko: *See*—
Makino, Hisao; and Makino, Masahiko, 4,702,830, Cl. 210-220.000.

Malashkina, Regina T.: *See*—
Kinderov, Petr A.; Volkov, Nikolai S.; Vasilieva, Natalia V.; and Malashkina, Regina T., 4,702,860, Cl. 252-511.000.

Malaval, Alain: *See*—
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,702,906, Cl. 424-70.000.

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Fontaine, Guy R.; Malizard, Max A.; and Demouron, Bernard R., 4,702,674, Cl. 417-44.000.

Malka, Jacob H.: *See*—
James, Robert; and Malka, Jacob H., 4,703,307, Cl. 340-347.0SY.

Mallory, Chester: *See*—
Perloff, David S.; and Mallory, Chester, 4,703,252, Cl. 324-62.000.

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Maly, Zdenek: *See*—
Hofling, Erich; and Maly, Zdenek, 4,703,187, Cl. 250-571.000.

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Mankey, Harry S.: *See*—
Oswald, Norman D.; Mankey, Harry S.; Franklin, Carl M.; Wilhelm, James M.; and Osborn, Ronnie M., 4,702,843, Cl. 280-707.000.

Mannesmann AG: *See*—
Brudereck, Ulrich; and Gabriel, Klaus-Dieter, 4,702,175, Cl. 105-154.000.
Elbracht, Kurt, 4,702,010, Cl. 33-178.00F.
Herre, Emil; Herre, Gerd; Zimmer, Guenter; and Cepin, Hermann, 4,702,461, Cl. 266-216.000.
Monheim, Peter; and Stadtfeld, Gerhard, 4,702,303, Cl. 164-491.000.
Sturm, Hans, 4,702,099, Cl. 72-366.000.

Mannesmann Demag Kunststofftechnik: *See*—
Fruntzek, Peter, 4,702,685, Cl. 425-182.000.

Manning, Richard J.: *See*—
Greasley, Michael J.; and Manning, Richard J., 4,702,183, Cl. 112-38.000.

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Fay, Gary; Mansmann, Jeffrey G.; and Wellnitz, Keith M., 4,703,390, Cl. 361-101.000.

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Wilson, Jerry F., 4,702,375, Cl. 206-434.000.

Marais, Jean-Luc: *See*—
Lombard, Claude; Brisset, Jean-Paul; Marais, Jean-Luc; and Catier, Gerard, 4,702,208, Cl. 123-339.000.

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Wruck, Paul D.; and Ryan, Adrian J., 4,702,421, Cl. 241-15.000.

Maravetz, Lester L., to FMC Corporation. Herbicidal 1-aryl-delta2-1,2,4-triazolin-5-ones. 4,702,763, Cl. 71-90.000.

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Hopp, Thomas P.; Bektesh, Susan L.; Conlon, Paul J., III; and March, Carl J., 4,703,004, Cl. 435-68.000.

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Marelco Power Systems, Inc.: *See*—
Burgher, Peter H.; and Boomer, John, 4,703,158, Cl. 219-90.000.

Margarit, Josette: *See*—
Franceschini, Jacqueline; Gardaix-Luthereau, Renee; and Margarit, Josette, 4,703,055, Cl. 514-400.000.

Margetts, Hugh G.: *See*—
Ingram, Brian; Margetts, Hugh G.; and England, Michael J., 4,702,352, Cl. 188-79.620.
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Margolin, George D., to Photon Devices, Ltd. Document scanner employing a fiber optic bundle and exhibiting grey scale. 4,702,552, Cl. 350-96.250.

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Okano, Keisuke, 4,703,320, Cl. 340-731.000.
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Yasuda, Akira; Akiyama, Kazuhisa; Nakao, Toshinari; and Yuasa, Hiroyoshi, 4,703,347, Cl. 358-102.000.
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Inoue, Tadashi; and Matsuura, Tosimi, 4,703,414, Cl. 364-147.000.
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Schmidt, Harald H.; and McDowall, Rory, 4,702,689, Cl. 425-548.000.
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Love, Paul M.; and Kelley, Bruce G., 4,702,766, Cl. 75-34.000.
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Banasiak, Joseph; and Powers, Samuel L., 4,702,479, Cl. 273-148.00R.
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Hagihara, Siro; Tsutani, Sadahiro; and Maeda, Yoichiro, 4,702,331, Cl. 180-9.320.
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,681, Cl. 418-55.000.
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,682, Cl. 418-55.000.

Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,683, Cl. 418-55.000.
Kawabata, Takao, 4,703,193, Cl. 307-66.000.
Matsumoto, Masaaki, 4,702,972, Cl. 429-34.000.
Nakajima, Isamu; Nakashima, Yasuo; Miyazaki, Nobuyuki; and Ishino, Kazuo, 4,702,087, Cl. 62-285.000.
Nakajima, Masayuki; Sato, Shinichi; Tokui, Akira; Kawai, Akira; Nagatomo, Masao; and Ozaki, Hiroji, 4,702,796, Cl. 156-653.000.
Ozaki, Minoru; and Tanaka, Kunimaro, 4,703,494, Cl. 375-19.000.
Shimano, Hiroki; Shimizu, Masahiro; Tsukamoto, Katsuhiro; and Inuishi, Masahide, 4,702,797, Cl. 156-653.000.
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, 4,703,227, Cl. 313-634.000.
Wataya, Seiji, 4,702,214, Cl. 123-488.000.

Mitsubishi Gas Chemical Company, Inc.: *See*—
Shimizu, Senzo; Nomura, Isao; and Narita, Kenichi, 4,702,859, Cl. 252-511.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Oyamoto, Toshiya; Makino, Katsuaki; and Ogawara, Fumio, 4,702,818, Cl. 208-81.000.
Rokksku, Tadashi; Houzouji, Akira; Omori, Shunji; and Toto, Takayuki, 4,702,652, Cl. 409-84.000.

Mitsubishi Paper Mills, Ltd.: *See*—
Haino, Kozo; Emoto, Kazuhiro; and Itoh, Akira, 4,702,983, Cl. 430-75.000.
Matsushita, Toshihiko; Morishita, Sadao; and Sekine, Mikiya, 4,703,335, Cl. 503-204.000.
Ohashi, Minoru; and Kaneko, Satoshi, 4,702,999, Cl. 430-445.000.

Mitsubishi Petrochemical Co., Ltd.: *See*—
Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, 4,702,977, Cl. 429-194.000.
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, 4,703,106, Cl. 530-307.000.
Matsuura, Mitsuyuki; and Fujita, Takashi, 4,703,026, Cl. 502-119.000.
Takahashi, Hiroshi; Kakizaki, Tetsuji; Kato, Mitsuyoshi; and Nishida, Koji, 4,702,554, Cl. 350-96.300.

Mitsuboshi Belting Ltd.: *See*—
Tanaka, Hiroyuki; Takami, Eiichi; Mishima, Kyoichi; Higashi, Mitsunobu; and Kumasaki, Toshimi, 4,702,729, Cl. 474-205.000.

Mitsuda, Tetsuya: *See*—
Fukuhara, Mikio; and Mitsuda, Tetsuya, 4,702,769, Cl. 75-233.000.

Mitsui, Hajime: *See*—
Yoshino, Tsunemi; Ishikawa, Katsuji; and Mitsui, Hajime, 4,702,583, Cl. 354-400.000.

Mitsui Toatsu Chemicals, Inc.: *See*—
Fukuda, Tamotsu; Shigeta, Shiro; Okuya, Hiroaki; Kuroiwa, Yasuyuki; and Sudo, Tadashi, 4,702,910, Cl. 424-92.000.

Mitsumori, Shigeyoshi: *See*—
Baba, Hideyuki; and Mitsumori, Shigeyoshi, 4,703,468, Cl. 369-44.000.

Miura, Ishi: *See*—
Sato, Atsushige; Miura, Ishi; Kumei, Yasuhiro; Okuno, Osamu; Nakano, Tsuyoshi; and Yoshida, Bunsaku, 4,702,765, Cl. 75-0.50B.

Miura, Morikazu: *See*—
Mutoh, Yoshihiko; and Miura, Morikazu, 4,702,836, Cl. 210-500.230.

Miyabayashi, Mitsutaka: *See*—
Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, 4,702,977, Cl. 429-194.000.

Miyama, Hiroshi: *See*—
Tomii, Kaoru; Miyama, Hiroshi; Kawauchi, Yoshikazu; and Nishida, Jun, 4,703,231, Cl. 315-366.000.

Miyamori, Shigeo: *See*—
Sugiyama, Norihide; Funato, Katsuro; Nagase, Hiroshi; Yamamoto, Seiichi; and Miyamori, Shigeo, 4,702,989, Cl. 430-137.000.

Miyamo:o, Shunsuke: *See*—
Nishida, Takao; Hiyama, Toru; Moriwaki, Kaoru; Ishiyama, Shun; and Miyamoto, Shunsuke, 4,703,257, Cl. 324-73.00R.

Miyamura, Katsunori: *See*—
Ueno, Takashi; Abo, Toshimi; and Miyamura, Katsunori, 4,702,080, Cl. 60-602.000.

Miyata, Toshio, to Kabushiki Kaisha Mitaka Kogyosho. Filter apparatus. 4,702,833, Cl. 210-333.010.

Miyauchi, Yukio; Nakagawa, Yuichi; Kurihara, Makoto; and Hayashi, Norifumi, to Three Bond Co., Ltd. Self-locking agent and self-locking screw material. 4,702,939, Cl. 42-195.000.

Miyazaki, Nobuyuki: *See*—
Nakajima, Isamu; Nakashima, Yasuo; Miyazaki, Nobuyuki; and Ishino, Kazuo, 4,702,087, Cl. 62-285.000.

Miyazawa, Shozo: *See*—
Ishii, Wataru; Miyazawa, Shozo; Tsuchiya, Shinji; Nakane, Hisashi; and Yokota, Akira, 4,702,992, Cl. 430-272.000.

Miyoshi, Yoshitake, to Mita Industrial Co., Ltd. Shell-type electrostatic copying apparatus. 4,702,587, Cl. 355-3.00R.

Mizuno, Masao: *See*—
Kameyama, Tsutomu; Kitamura, Jiro; Takigawa, Tetsuo; and Mizuno, Masao, 4,703,061, Cl. 514-551.000.

Mobil Oil Corporation: *See*—
Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., 4,702,316, Cl. 166-272.000.
Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., 4,702,318, Cl. 166-274.000.
Duncan, Gary L., 4,702,954, Cl. 428-213.000.
Kokotailo, George T.; and Rohrman, Albert C., Jr., 4,703,025, Cl. 502-60.000.

Mochimaru, Hideaki; Shimada, Kazuyuki; and Hirasawa, Junichi, to Ricoh Company, Ltd. Optical recording head and belt positioning apparatus. 4,703,334, Cl. 346-160.000.

Moda, Edoardo: *See*—
Tabacco, Alessandro; Moda, Edoardo; and Tarli, Paolo, 4,703,015, Cl. 436-74.000.

Moetting, Goetz: *See*—
Huth, Lothar; Dahm, Horst; Moetting, Goetz; and Haeberle, Fritz, 4,703,398, Cl. 362-61.000.

Mohr, Friedemann, to International Standard Electric Corp. Rotation rate measuring instrument. 4,702,599, Cl. 356-350.000.

Mohri, Fumihiko: *See*—
Sakauchi, Takashi; Mohri, Fumihiko; Tomoda, Naohisa; and Nakatsuka, Satoshi, 4,702,852, Cl. 252-62.540.

Mold-Masters Limited: *See*—
Schmidt, Harald H.; and McDowall, Rory, 4,702,689, Cl. 425-548.000.

Moldawer, Lyle L.: *See*—
Blackburn, George L.; Babayan, Vigen K.; Bistrian, Bruce; Moldawer, Lyle L.; and Cotter, Richard, 4,703,062, Cl. 514-552.000.

Momose, Yuya, to NEC Corporation. Data processing unit diagnosis control apparatus. 4,703,446, Cl. 364-580.000.

Monheim, Peter; and Stadtfeld, Gerhard, to Mannesmann AG. Width adjustment of molds for continuously casting slab ingots. 4,702,303, Cl. 164-491.000.

Monma, Hideo: *See*—
Enomoto, Yoshinori; Monma, Hideo; Ohta, Shunzo; and Sasaki, Takeshi, 4,703,483, Cl. 371-24.000.

Monsigny, Michel; and Mayer, Roger, to Centre National de la Recherche Scientifique (CNRS). Water-soluble acylated derivatives of peptides or amino acids, their preparation and their use. 4,703,107, Cl. 530-330.000.

Montedison S.p.A.: *See*—
Camaggi, Giovanni; Gozzo, Franco; Signorini, Ernesto; and Palla, Ottorino, 4,702,762, Cl. 71-90.000.

Montgomery, William J.; and Nicholson, Eric, to Short Brothers PLC. Flight control apparatus. 4,702,435, Cl. 244-3.130.

Montier, Patrick: *See*—
Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., 4,702,172, Cl. 102-521.000.

Moon, William G.: *See*—
Hahn, Peter S.; Stone, Thomas R.; Moon, William G.; and Harrison, Joel N., 4,703,176, Cl. 250-231.0SE.

Moreau, Pierre A.: *See*—
Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., 4,702,172, Cl. 102-521.000.

Morganti, Victor M.; and Prange, Patrick E., to Honeywell Information Systems Inc. Call instruction for ring crossing architecture. 4,703,417, Cl. 364-200.000.

Mori, Hiromichi: *See*—
Kinoshita, Toshiyuki; Arai, Toshiaki; Sato, Takao; Kubo, Takashige; Yoshizawa, Yasufumi; and Mori, Hiromichi, 4,703,422, Cl. 364-200.000.

Mori, Kei. Light source device. 4,702,546, Cl. 350-96.100.

Mori, Sanae, to Daido Metal Company Ltd. Composition for sliding member. 4,703,076, Cl. 524-420.000.

Mori, Shigeo; and Matsumoto, Junichiro, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Polyethers having tertiary alcoholic terminals. 4,703,114, Cl. 536-4.100.

Moribe, Yoshihiro: *See*—
Kumazawa, Kiyotake; Minamide, Noriaki; Moribe, Yoshihiro; Takahashi, Mikio; Beppu, Osamu; and Mitamura, Masahiro, 4,703,242, Cl. 318-685.000.

Morikawa, Chiharu: *See*—
Kano, Toshio; Knodo, Masamichi; Ikeda, Tatsufumi; and Morikawa, Chiharu, 4,703,059, Cl. 514-493.000.

Morino, Asami: *See*—
Okubo, Yasumi; and Morino, Asami, 4,703,143, Cl. 219-69.00W.

Morino, Seiji: *See*—
Tokura, Norihito; Kawai, Hisasi; Goto, Masahiro; Morino, Seiji; and Soumiya, Masato, 4,702,221, Cl. 123-606.000.

Morioka, Toru, to Sanyo Electric Co., Ltd. Battery apparatus for an electric shaver. 4,703,247, Cl. 320-13.000.

Morisawa, Kunio: *See*—
Taga, Yutaka; Kubo, Seitoku; Kashihara, Yuji; Morisawa, Kunio; Takada, Mitsuru; and Nakamura, Yasunari, 4,702,341, Cl. 180-249.000.

Morishige, Yuge: *See*—
Takeuchi, Kunihiko; and Morishige, Yuge, 4,703,244, Cl. 318-696.000.

Morishita, Sadao: *See*—
Matsushita, Toshihiko; Morishita, Sadao; and Sekine, Mikiya, 4,703,335, Cl. 503-204.000.

Morita, Kouichi: *See*—
Nakayama, Koji; Yoshida, Ryo; and Morita, Kouichi, 4,702,764, Cl. 71-92.000.

Morita, Masao: *See*—
Tanaka, Akinobu; Morita, Masao; Imamura, Saburo; Tamamura, Toshiaki; and Kogure, Osamu, 4,702,990, Cl. 430-197.000.

Moritz, Werner, to Kabelschlepp GmbH. Carrier for energy and supply lines. 4,702,281, Cl. 138-120.000.

Moriwaki, Kaoru: *See*—
Nishida, Takao; Hiyama, Toru; Moriwaki, Kaoru; Ishiyama, Shun; and Miyamoto, Shunsuke, 4,703,257, Cl. 324-73.00R.

Moriyama, Masao; Ohta, Masahiro; Yagi, Toshiaki; and Kawano, Kazuhiro, to Yokogawa Electric Corporation; and Yokagawa Medical Systems, Limited. Operator console for imaging diagnostic apparatus. 4,702,257, Cl. 128-653.000.

Moriyama, Yoshiaki; and Hosaka, Sumio, to Pioneer Electronic Corporation. Video format signal recording and reproducing method. 4,703,369, Cl. 358-343.000.

Moriyasu, Takashi, to Kabushiki Kaisha Toshiba. Device for measuring the shape of a three-dimensional object. 4,703,443, Cl. 364-559.000.

Mork, Phillip W.; Kraschnewski, Melvin W.; and Gilmore, Carl D., to Becor Western Inc. Continuous mining machine. 4,702,524, Cl. 299-64.000.

Morris, Gordon A., to Santa Fe International Corporation. Pipe initiation anchor. 4,702,646, Cl. 405-169.000.

Morris, John M.: *See*—
Ambruster, Kurt; Green, Charles J.; and Morris, John M., 4,702,268, Cl. 137-202.000.

Morris, Merle E.; and Senft, Stephen P., to GTE Products Corporation. Method of making electric lamp with internal conductive reflector. 4,702,717, Cl. 445-27.000.

Morris, Robert A.; and Rajotte, Paul T., to General Electric Company. Method of forming signal processor module for ground fault circuit breaker. 4,702,002, Cl. 29-837.000.

Morrison, Bruce L.: *See*—
Brinkman, Earl H.; and Morrison, Bruce L., 4,702,671, Cl. 415-134.000.

Morstad, David P. Variable powered contact lens. 4,702,573, Cl. 351-161.000.

Morton Thiokol, Inc.: *See*—
Ceraso, Arcangelo B., 4,702,789, Cl. 156-256.000.

Moschner, Vernon D. Fence assembly. 4,702,459, Cl. 256-19.000.

Moss, Brian F.; and Brent, Richard J., to Ciba-Geigy AG. Processing device. 4,702,582, Cl. 354-331.000.

Mostofizadeh-Ghalamfarsa, Chapar: *See*—
Gockel, Karl-Heinz; and Mostofizadeh-Ghalamfarsa, Chapar, 4,702,085, Cl. 62-101.000.

Motooka, Wesley D., to Ford Aerospace & Communications Corporation. Sensor for hemispherical applications. 4,703,179, Cl. 250-334.000.

Motorola, Inc.: *See*—
Berliner, Shlomo; Vered, Areyh; Shmuel, Reich; and Vaige, Moshe, 4,703,259, Cl. 324-95.000.
Bynum, Byron G., 4,703,455, Cl. 365-174.000.
Fay, Gary; Mansmann, Jeffrey G.; and Wellnitz, Keith M., 4,703,390, Cl. 361-101.000.
Gallup, Michael G.; and McLaughlin, Kevin L., 4,703,203, Cl. 307-446.000.
Kwitkowski, Peter A.; Nanni, Peter; Missele, Carl; O'Shea, Norman E.; and Pirih, Anthony M., 4,703,289, Cl. 333-1.100.
Mitchell, Curtis W.; and Johnson, Barry C., 4,702,941, Cl. 427-250.000.
Rozanski, Walter J., Jr.; and Laird, Kevin M., 4,703,520, Cl. 455-75.000.
Stipanuk, James J., 4,703,458, Cl. 365-189.000.

Moyaert, Werner, to Siemens Aktiengesellschaft. Contact spring. 4,702,545, Cl. 439-856.000.

Mrazek, William C., Jr.: *See*—
Owens, Thomas M.; Wagner, Thomas J.; and Mrazek, William C., Jr., 4,702,924, Cl. 426-92.000.

MTU Friedrichschafen GmbH: *See*—
Leicht, Werner; Ruetz, Georg; and Giesselmann, Juergen, 4,702,672, Cl. 415-164.000.

MTU Motoren-und Turbinen-Union Munchen GmbH: *See*—
Ding, Kurt; Brandt, Helmut; and Wenzl, Josef, 4,703,326, Cl. 340-870.160.

Muck, Karl-Friedrich; and Burg, Karlheinz, to Hoechst Aktiengesellschaft. Process for the continuous preparation of trioxane. 4,703,129, Cl. 549-368.000.

Mudge, Paul R., to National Starch and Chemical Corporation. Binders for nonwovens based on EVA-maleate copolymers. 4,702,957, Cl. 428-288.000.

Muellenberg, Ralph. Clamp apparatus for connecting members having cylindrical surfaces. 4,702,635, Cl. 403-15.000.

Muellenberg, Ralph. Conical stressing device for connecting a hub to a shaft. 4,702,637, Cl. 403-373.000.

Mueller, Dieter J., to Huels Aktiengesellschaft. Process for the production of 1,2,3-trichloro-2-methylpropane. 4,702,809, Cl. 204-157.630.

Mueller, James P.; and Phelps, Weldon L., to Caterpillar Inc. Clutch brake steering control. 4,702,358, Cl. 192-13.00R.

Mueller, Wilhelm; Overath, Friedhelm; and Weyer, Michael, to Georg Fischer Aktiengesellschaft. Flange connection for fiber-reinforced plastic pipe pieces. 4,702,498, Cl. 285-55.000.

Muething, Gerald F., Jr., to Nicolet Instrument Corporation. Method for measuring skew or phase difference in electronic systems. 4,703,448, Cl. 364-481.000.

Muguruma, Taku; and Ohuchi, Seiji, to Mazda Motor Corporation. Shift indicator system for vehicle. 4,703,304, Cl. 340-52.00R.

Mukamal, Harold: *See*—
Ashlock, Lysander T.; Mukamal, Harold; and White, William H., 4,702,773, Cl. 106-287.120.

Mulholland, D. Lindsay; and Sheppard, John D., to Ontario Research Foundation. Separation of volatiles from aqueous solutions by gas stripping. 4,703,007, Cl. 435-161.000.

Muller, Arno, to Pitney Bowes Inc. Value selector security system. 4,702,164, Cl. 101-91.000.

Muller, Ernst, to Schips, Helmut. Electronic control device for industrial sewing machines. 4,703,432, Cl. 364-470.000.

Muller, Richard: *See*—
Jonas, Friedrich; Muller, Richard; Merten, Rudolf; and Rottmaier, Ludwig, 4,702,953, Cl. 428-209.000.

Mumford, Ronald W. J., to Rank Cintel Ltd. Linear image sensor having some parts selectively read or disabled. 4,703,365, Cl. 358-293.000.

Munk, Michael. Internal combustion engine system with fog injection and heat exchange. 4,702,074, Cl. 60-39.511.

Munro, Robert; and Speaight, David C., to AE PLC. Pistons. 4,702,151, Cl. 92-237.000.

Murai, Keiichi: *See*—
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,702,981, Cl. 430-69.000.

Murakami, Kanemitsu: *See*—
Iguchi, Yukinobu; Murakami, Kanemitsu; and Kikuchi, Masahiro, 4,703,223, Cl. 313-414.000.

Murakami, Seiro: *See*—
Matsuura, Toshio; Murakami, Seiro; Imai, Yuji; Ohta, Kazuya; and Tanimoto, Akikazu, 4,702,606, Cl. 356-401.000.

Murakami, Tomoyoshi: *See*—
Matsuo, Shigeru; Murakami, Tomoyoshi; and Takasawa, Ryuichi, 4,703,104, Cl. 528-211.000.

Muraki, Kazunori, to NEC Corporation. Language processing dictionary for bidirectionally retrieving morphemic and semantic expressions. 4,703,425, Cl. 364-419.000.

Muramatsu, Tersuro: *See*—
Kadono, Masaru; Nago, Kumio; Yamamoto, Tatsushi; Muramatsu, Tersuro; Tsuchimoto, Shuuhei; Yoshikawa, Mitsuhiko; and Tomita, Masatoshi, 4,702,935, Cl. 427-42.000.

Murata Kikai Kabushki Kaisha: *See*—
Yoshimoto, Yoshio; Kondoh, Minoru; and Terada, Yoshiyuki, 4,703,240, Cl. 318-587.000.

Murata Manufacturing Co., Ltd.: *See*—
Honda, Yukio, 4,702,370, Cl. 206-331.000.
Nishikawa, Toshio; and Yorita, Tadahiro, 4,703,291, Cl. 333-202.000.
Takahashi, Hiroyuki; and Toyoshima, Isao, 4,703,218, Cl. 310-348.000.

Murata, Yasuto; Tezuka, Junichi; and Yamamoto, Kenji, to Electroplating Engineers of Japan, Limited. Plating device for minute portions of connector terminals. 4,702,811, Cl. 204-206.000.

Murphy, Donald R.: *See*—
Carter, Robert E.; and Murphy, Donald R., 4,702,418, Cl. 239-101.000.

Murphy, Frank H., to Dow Chemical Company, The. Process for producing 2,3,5,6-tetrachloropyridine. 4,703,123, Cl. 546-345.000.

Murton, Henry R.: *See*—
O'Callaghan, Patrick; and Murton, Henry R., 4,702,743, Cl. 8-527.000.

Muschner, Udo, to Didier-Werke AG. Reversible refractory plate in sliding closure unit and method for use thereof. 4,702,460, Cl. 266-45.000.

Musil, Joseph E., to Cedarapids, Inc. Extensible screed assembly for a bituminous paver. 4,702,642, Cl. 404-118.000.

Mustonen, Olavi M.: *See*—
Engstrom, Ulf F. I.; Allroth, Sven E.; and Mustonen, Olavi M., 4,702,772, Cl. 75-243.000.

Muterspaugh, Max W., to RCA Corporation. Dual gate tunable oscillator. 4,703,286, Cl. 331-117.0FE.

Mutoh, Yoshihiko; and Miura, Morikazu, to Asahi Kasei Kogyo Kabushiki Kaisha. Porous fluorine resin membrane and process for preparing the same. 4,702,836, Cl. 210-500.230.

Mutschler, Carl E.; and Warner, Mark E., to SmithKline Beckman Corporation. Pattern recognition system with working area detection. 4,702,595, Cl. 356-39.000.

Muuttonen, Timo: *See*—
Salmi, Pekka; and Muuttonen, Timo, 4,702,326, Cl. 173-104.000.

Mylonakis, Stamatios G.: *See*—
Giori, Claudio; and Mylonakis, Stamatios G., 4,703,083, Cl. 525-87.000.
Giori, Claudio; and Mylonakis, Stamatios G., 4,703,084, Cl. 525-87.000.

Nabisco Brands, Inc.: *See*—
Verrico, Marsha K., 4,702,925, Cl. 426-96.000.

Nagakurz, Kouichi: *See*—
Yamamoto, Shinji; Kaijiri, Kouhei; Nagakura, Kouichi; Oda, Denichi; Matsumori, Yasuo; and Nakayama, Kimio, 4,703,086, Cl. 525-133.000.

Nagamine, Kenzi: *See*—
Nakayama, Nobuo; Nagamine, Kenzi; Ueda, Kazuya; and Saito, Fuminari, 4,703,186, Cl. 250-566.000.

Nagao, Yasuyuki: *See*—
Mimura, Yoshinori; and Nagao, Yasuyuki, 4,702,791, Cl. 156-614.000.

Nagasaka, Nagahiko, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Permanent magnet type linear electromagnetic actuator. 4,703,297, Cl. 335-222.000.

Nagase, Hiroshi: *See*—
Sugiyama, Norihide; Funato, Katsuro; Nagase, Hiroshi; Yamamoto, Seiichi; and Miyamori, Shigeo, 4,702,989, Cl. 430-137.000.

Nagashima, Akira, to Kioritz Corporation. Chain with cutting teeth. 4,702,139, Cl. 83-830.000.

Nagatomo, Masao: *See*—
Nakajima, Masayuki; Sato, Shinichi; Tokui, Akira; Kawai, Akira; Nagatomo, Masao; and Ozaki, Hiroji, 4,702,796, Cl. 156-653.000.

Nagayasu, Tadahito: *See*—
Hasegawa, Katsumi; Ohno, Michio; Nagayasu, Tadahito; and Umeda, Kazuo, 4,702,871, Cl. 264-101.000.

Nago, Kumio: *See*—
Kadono, Masaru; Nago, Kumio; Yamamoto, Tatsushi; Muramatsu, Tersuro; Tsuchimoto, Shuuhei; Yoshikawa, Mitsuhiko; and Tomita, Masatoshi, 4,702,935, Cl. 427-42.000.

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Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, to Daiken Kogyo Co., Ltd. Fluorine-containing copolymer. 4,703,095, Cl. 526-247.000.

Nakagawa, Tsuneo: *See*—
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,703,095, Cl. 526-247.000.

Nakagawa, Yuichi: *See*—
Miyauchi, Yukio; Nakagawa, Yuichi; Kurihara, Makoto; and Hayashi, Norifumi, 4,702,939, Cl. 42-195.000.

Nakahara, Katuzi: *See*—
Matsuura, Kazuo; Nakahara, Katuzi; and Hayashi, Kenji, 4,702,980, Cl. 430-63.000.

Nakai, Masaaki: *See*—
Taniguchi, Nobuyuki; Omaki, Takanobu; Ishikawa, Norio; Nakai, Masaaki; Ishida, Tokuji; and Hamada, Masataka, 4,702,584, Cl. 354-400.000.

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Nomura, Shigeo; and Nakanishi, Syoji, 4,702,007, Cl. 30-423.000.

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Saka, Kazuhiko; Hisano, Atsushi; Kato, Michitaka; Masaki, Toshimichi; and Nakatsuka, Nobuo, 4,703,512, Cl. 382-22.000.

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Sakauchi, Takashi; Mohri, Fumihiko; Tomoda, Naohisa; and Nakatsuka, Satoshi, 4,702,852, Cl. 252-62.540.

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Yamamoto, Shinji; Kaijiri, Kouhei; Nagakura, Kouichi; Oda, Denichi; Matsumori, Yasuo; and Nakayama, Kimio, 4,703,086, Cl. 525-133.000.

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Sueyoshi, Susumu; Tokui, Satoru; and Nanba, Keiichiro, 4,703,450, Cl. 364-900.000.

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Kwitkowski, Peter A.; Nanni, Peter; Missele, Carl; O'Shea, Norman E.; and Pirih, Anthony M., 4,703,289, Cl. 333-1.100.

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Shimizu, Senzo; Nomura, Isao; and Narita, Kenichi, 4,702,859, Cl. 252-511.000.

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Prestridge, Floyd L.; and Johnson, Bruce C., 4,702,815, Cl. 204-302.000.

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Hampton, Leonard; and Hohulin, Samuel E., 4,701,975, Cl. 15-383.000.

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Kinderov, Petr A.; Volkov, Nikolai S.; Vasilieva, Natalia V.; and Malashkina, Regina T., 4,702,860, Cl. 252-511.000.

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Guenther, Hans-Juergen; Golbeck, Ortwin; and Nauck, Joachim, 4,702,440, Cl. 244-158.00R.
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Gyngell, Michael L.; and Nayler, Graham L., 4,703,268, Cl. 324-309.000.
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Hamano, Tsutomu; and Shikano, Hiroshi, 4,702,629, Cl. 400-56.000.
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Whisler, Edwin L.; Griswold, Frederick D., Jr.; and Neagle, Stuart L., 4,702,520, Cl. 297-417.000.
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Ikeda, Kiyoshi, 4,703,479, Cl. 370-104.000.
Matsuo, Youichi, 4,703,339, Cl. 357-81.000.
Momose, Yuya, 4,703,446, Cl. 364-580.000.
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Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,702,556, Cl. 350-320.000.
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Traitler, Helmut; and Winter, Heike, 4,703,060, Cl. 514-549.000.
Nestec S.A.: *See*—
Tuot, James, 4,702,799, Cl. 159-48.100.
Neumann, Peter: *See*—
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.
Helwig, Reinhard; Neumann, Peter; Aumueller, Alexander; and Trauth, Hubert, 4,703,072, Cl. 524-99.000.
Neumeister, Herbert: *See*—
Naoumidis, Aristides; Neumeister, Herbert; Schirbach, Arno; Struck, Bernd D.; and Triefenbach, Dieter, 4,702,784, Cl. 156-89.000.
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Hawiger, Jack J.; Timmons, Sheila; and Kloczewiak, Marek, 4,703,039, Cl. 514-21.000.
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Hattori, Isao; and Enomoto, Akio, 4,702,138, Cl. 83-785.000.
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Ojima, Juji; and Hino, Isao, 4,702,726, Cl. 474-101.000.
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Herzog, William P.; and Nichols, William E., 4,703,356, Cl. 358-160.000.
Nicholson, Eric: *See*—
Montgomery, William J.; and Nicholson, Eric, 4,702,435, Cl. 244-3.130.
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Muething, Gerald F., Jr., 4,703,448, Cl. 364-481.000.
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Yamai, Iwao, 4,703,023, Cl. 501-102.000.
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Sano, Yosiaki, 4,702,156, Cl. 98-40.240.
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Izuta, Tadao, 4,702,067, Cl. 57-243.000.
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Matsuura, Toshio; Murakami, Seiro; Imai, Yuji; Ohta, Kazuya; and Tanimoto, Akikazu, 4,702,606, Cl. 356-401.000.
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Oyamoto, Toshiya; Makino, Katsuaki; and Ogawara, Fumio, 4,702,818, Cl. 208-81.000.
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Ushimaru, Koichi; Nakamichi, Koichi; and Saito, Hitoshi, 4,702,918, Cl. 424-461.000.
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Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige, and Saijo, Hideo, 4,702,872, Cl. 264-114.000.
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Tokura, Norihito; Kawai, Hisasi; Goto, Masahiro; Morino, Seiji; and Soumiya, Masato, 4,702,221, Cl. 123-606.000.
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Takahashi, Toshihiko; Tarui, Toshimi; and Sato, Hiroshi, 4,702,778, Cl. 148-12.00F.
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Watanabe, Hitoshi, 4,702,628, Cl. 384-580.000.
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Tomii, Kaoru; Miyama, Hiroshi; Kawauchi, Yoshikazu; and Nishida, Jun, 4,703,231, Cl. 315-366.000.
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Takahashi, Hiroshi; Kakizaki, Tetsuji; Kato, Mitsuyoshi; and Nishida, Koji, 4,702,554, Cl. 350-96.300.
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Kita, Ryusuke; Nishigaki, Satoshi; and Tsuchimoto, Shuhei, 4,701,997, Cl. 437-5.000.
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Shimozawa, Toru; Nishimatsu, Masaharu; and Saito, Yoshiaki, 4,702,959, Cl. 428-323.000.
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Yoshino, Hisakazu; Nishimura, Shinichi; and Takagi, Kazutoshi, 4,702,570, Cl. 350-516.000.
Nishimura, Takashi, to Shimadzu Corporation. Apparatus for spectroanalysis. 4,703,437, Cl. 364-498.000.
Nishino, Tadashi: *See*—
Nakanori, Takayuki; Kimura, Tomoaki; and Nishino, Tadashi, 4,702,300, Cl. 164-154.000.
Nishiyama, Kunio: *See*—
Maeda, Yoshihiko; Nogami, Toshiaki; Kashiwagi, Shigeru; Sakurai, Kenji; and Nishiyama, Kunio, 4,702,517, Cl. 296-214.000.
Nishiyama, Masaaki; and Tanaka, Atsuyuki, to Minolta Camera Kabushiki Kaisha. Character signal generator. 4,703,438, Cl. 364-519.000.
Nissan Motor Company, Limited: *See*—
Hori, Yasuaki; and Kishima, Masayoshi, 4,701,977, Cl. 16-266.000.
Hosaka, Akio; and Takase, Sadao, 4,703,428, Cl. 364-424.100.
Kasai, Junichi; Imai, Hiroshi; and Tsuda, Hiroshi, 4,703,502, Cl. 381-24.000.
Oshiage, Katsunori, 4,702,128, Cl. 74-866.000.
Sakata, Masao, 4,703,429, Cl. 364-426.000.
Ueno, Takashi; Abo, Toshimi; and Miyamura, Katsunori, 4,702,080, Cl. 60-602.000.
Uno, Takaaki; Dan, Takuya; and Orikawa, Michihiro, 4,702,346, Cl. 181-207.000.
Yamaguchi, Kirotsugu; Fukushima, Naoto; Akatsu, Yousuke; and Hano, Sunao, 4,702,490, Cl. 280-707.000.
Nisshin Steel Co., Ltd.: *See*—
Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, 4,702,968, Cl. 428-623.000.
Nakanori, Takayuki; Kimura, Tomoaki; and Nishino, Tadashi, 4,702,300, Cl. 164-154.000.
Nitanda, Hiroshi: *See*—
Saito, Takashi; Nitanda, Hiroshi; Inuzuka, Tsuneki; Tokuhara, Mitsuhiro; and Honda, Haruhisa, 4,702,586, Cl. 355-3.00R.
Nitsch, Reinhold. Paint can handle and spout attachment. 4,702,395, Cl. 222-109.000.
Nixdorf Computer AG: *See*—
Bogdanski, Michael, 4,703,379, Cl. 360-118.000.
Holland-Letz, Guenter; Jaeger, Waldemar; Tewes, Udo; and Weigel, Peter, 4,703,162, Cl. 235-379.000.
Noack, Timothy J.: *See*—
Gano, John C.; Schwendemann, Kenneth L.; Noack, Timothy J.; and Godfrey, Craig W., 4,702,320, Cl. 166-343.000.

Nobar Ky: *See*—
Ryynanen, Seppo I., 4,702,846, Cl. 210-788.000.
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Ono, Kenji; and Nobutoki, Kazuhiro, 4,703,293, Cl. 335-80.000.
Nocera, Patrick C. Adjustable workpiece securing device. 4,702,512, Cl. 269-77.000.
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Tokumaru, Sennosuke; Kubo, Michinori; and Nogami, Mari, 4,702,923, Cl. 426-61.000.
Nogami, Toshiaki: *See*—
Maeda, Yoshihiko; Nogami, Toshiaki; Kashiwagi, Shigeru; Sakurai, Kenji; and Nishiyama, Kunio, 4,702,517, Cl. 296-214.000.
Noh, Akihiko; Sato, Shinichi; Kakuda, Itsusuke; and Kanno, Shigeyuki, to Kabushiki Kaisha Toshiba; and Toshiba Tungaloy Co., Ltd. Automatic tool assembly apparatus. 4,701,994, Cl. 29-568.000.
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Nojima, Kazuo: *See*—
Hirano, Yasuo; and Nojima, Kazuo, 4,702,964, Cl. 428-447.000.
Nomura, Isao: *See*—
Shimizu, Senzo; Nomura, Isao; and Narita, Kenichi, 4,702,859, Cl. 252-511.000.
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Nona, Jerry R.: *See*—
Chambers, Joseph W., Sr.; and Nona, Jerry R., 4,702,422, Cl. 241-46.060.
Nordberg, Anthony, to GQ Defence Equipment Limited. Target image presentation system. 4,702,699, Cl. 434-20.000.
Northeastern University: *See*—
Davies, Geoffrey; and El-Toukhy, Ahmed, 4,702,748, Cl. 44-56.000.
Northern Telecom Limited: *See*—
Beun, Roger A., 4,702,535, Cl. 312-308.000.
Pollard, Brian J., 4,703,500, Cl. 379-252.000.
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Kannapell, John T.; Asdurian, Haig; and Buttles, Robert F., 4,702,145, Cl. 89-1.803.
Norwood, Timothy J.: *See*—
Hall, Laurance D.; and Norwood, Timothy J., 4,703,270, Cl. 324-309.000.
NovaGene, Inc.: *See*—
Kit, Malon; and Kit, Saul, 4,703,011, Cl. 435-236.000.
Noyes, Robert W., to Honeywell Information Systems Inc. Latch and lock electrical connector housing. 4,702,542, Cl. 439-347.000.
Npp Po Elektrotermia: *See*—
Bakalov, Nikolay G.; Penev, Penyo I.; Ivanov, Ivan K.; Velev, Velyo T.; Savov, Peter H.; and Vulchev, Alexander Y., 4,703,493, Cl. 373-95.000.
NTN-Rulon Industries Co., Ltd.: *See*—
Egami, Masaki, 4,703,075, Cl. 524-269.000.
Nunn, John O., Jr.: *See*—
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Nutt, Ruth F.: *See*—
Freidinger, Roger; Nutt, Ruth F.; Lyle, Terry A.; and Saperstein, Richard, 4,703,034, Cl. 514-11.000.
N.V. Weefautomaten Picanol: *See*—
Shaw, Henri, 4,702,283, Cl. 139-348.000.
Nysen, Paul A.: *See*—
Rossetti, Anthony J.; and Nysen, Paul A., 4,703,327, Cl. 342-44.000.
Obayashi, Akira: *See*—
Beppu, Teruhiko; Takesako, Kazutoh; Nakamura, Teruya; and Obayashi, Akira, 4,703,128, Cl. 549-270.000.
Oberschmidt, Alec: *See*—
Shillington, Richard A.; and Oberschmidt, Alec, 4,702,385, Cl. 220-18.000.
O'Boyle, Dolores: *See*—
Prunesti, James; Bell, William D.; Gannaway, Jane P.; O'Boyle, Dolores; and Tedeschi, Anthony, 4,701,964, Cl. 2-406.000.
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O'Connell, James P.: *See*—
Campbell, Robert L.; Wagner, Daniel B.; and O'Connell, James P., 4,703,017, Cl. 436-501.000.
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Oda, Hajime: *See*—
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, 4,702,579, Cl. 354-21.000.
Oda, Nobutaka: *See*—
Ichihara, Takeo; Watanabe, Shuichi; Futami, Takashi; and Oda, Nobutaka, 4,703,401, Cl. 362-80.000.
Oda, Shunri: *See*—
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Odani, Yusuke; Akechi, Kiyoaki; and Kuroishi, Nobuhito, to Sumitomo Electric Industries, LTD. Aluminum alloy and method for producing the same. 4,702,885, Cl. 419-23.000.
Odo, Satoshi; Iida, Tetsuo; Abe, Atsushi; and Tsuchida, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Soundproof type engine working machine. 4,702,201, Cl. 123-2.000.
O'Donnell & Associates, Inc.: *See*—
Porowski, Jan S.; Badlani, Manu L.; O'Donnell, William J.; and Hampton, Edward J., 4,702,880, Cl. 376-305.000.
O'Donnell, William J.: *See*—
Porowski, Jan S.; Badlani, Manu L.; O'Donnell, William J.; and Hampton, Edward J., 4,702,880, Cl. 376-305.000.
O'Donnell, William P.: *See*—
Skinner, Harry W.; Skinner, James W.; O'Donnell, William P.; and Skinner, William O., 4,702,645, Cl. 405-154.000.
Off-The-Wall Products: *See*—
Copley, Michael C.; and Clark, Alonzo W., IV, 4,702,614, Cl. 368-72.000.
Offenbacher, Helmut: *See*—
Kroneis, Herbert; and Offenbacher, Helmut, 4,703,182, Cl. 250-458.100.
Ogawa, Hironobu: *See*—
Hino, Youzi; and Ogawa, Hironobu, 4,703,302, Cl. 338-293.000.
Ogawa, Kikuo: *See*—
Minoura, Takayoshi; and Ogawa, Kikuo, 4,703,397, Cl. 361-428.000.
Ogawa, Kyosuke: *See*—
Matsumoto, Yasuyuki; Murai, Keiichi; Fukuda, Tadaji; and Ogawa, Kyosuke, 4,702,981, Cl. 430-69.000.
Ogawa, Takayuki: *See*—
Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.
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Oyamoto, Toshiya; Makino, Katsuaki; and Ogawara, Fumio, 4,702,818, Cl. 208-81.000.
Ogden, Richard, to John Zink Company. Even flow radial burner tip. 4,702,691, Cl. 431-187.000.
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, to Seikosha Co., Ltd. Automatic film sensitivity change-over device. 4,702,579, Cl. 354-21.000.
Ogman, Abraham O., to Avco Corporation. Surface treatment for carbon and product. 4,702,960, Cl. 428-367.000.
Ohara, Shuzo; and Kitamura, Ryoichi, to Goyo Paper Working Co., Ltd. Manufacturing method of release paper. 4,702,874, Cl. 264-171.000.
Ohashi, Minoru; and Kaneko, Satoshi, to Mitsubishi Paper Mills, Ltd. Silver halide photographic light-sensitive materials. 4,702,999, Cl. 430-445.000.
Ohbayashi, Akira: *See*—
Inoue, Osamu; and Ohbayashi, Akira, 4,703,370, Cl. 360-10.200.
Ohi Seisakusho Company, Limited: *See*—
Hori, Yasuaki; and Kishima, Masayoshi, 4,701,977, Cl. 16-266.000.
Ohmi, Masatoshi; Yoneda, Toshihiko; and Uchiyama, Kazuo, to Yamaha Hatsudoki Kabushiki Kaisha. Intake means of internal combustion engine. 4,702,203, Cl. 123-52.0MV.
Ohmura, Ryuichi, to Fuji Kogyo Co., Ltd. Cylindrical reel seat for a fishing rod. 4,702,032, Cl. 43-22.000.
Ohnishi, Toshikazu: *See*—
Fukumoto, Hiroshi; Ohnishi, Toshikazu; and Arahara, Kohzoh, 4,702,988, Cl. 430-137.000.
Ohno, Michio: *See*—
Hasegawa, Katsumi; Ohno, Michio; Nagayasu, Tadahito; and Umeda, Kazuo, 4,702,871, Cl. 264-101.000.
Ohno, Satoshi: *See*—
Hirano, Atsuo; Hiramitsu, Tetsushi; and Ohno, Satoshi, 4,702,705, Cl. 439-15.000.
Ohta, Eiichi: *See*—
Igi, Hisashi; Yamada, Tomohiro; Higuchi, Tomohisa; Ohta, Eiichi; and Yazawa, Hiroaki, 4,702,630, Cl. 400-82.000.
Ohta, Kazuya: *See*—
Matsuura, Toshio; Murakami, Seiro; Imai, Yuji; Ohta, Kazuya; and Tanimoto, Akikazu, 4,702,606, Cl. 356-401.000.
Ohta, Masahiro: *See*—
Moriyama, Masao; Ohta, Masahiro; Yagi, Toshiaki; and Kawano, Kazuhiro, 4,702,257, Cl. 128-653.000.
Ohta, Masaki: *See*—
Takenaka, Kenji; Suzuki, Shinichi; Kayukawa, Hiroaki; and Ohta, Masaki, 4,702,677, Cl. 417-222.000.
Ohta, Shunzo: *See*—
Enomoto, Yoshinori; Monma, Hideo; Ohta, Shunzo; and Sasaki, Takeshi, 4,703,483, Cl. 371-24.000.
Ohtaka, Hiroshi; Kanazawa, Toshiro; Ito, Keizo; and Tsukamoto, Goro, to Kanebo Ltd. Novel 1-benzhydryl-4-cinnamylpiperazine derivatives, and pharmaceutical compositions comprising said compounds as active ingredient for treating a cerebrovascular disease. 4,703,048, Cl. 514-255.000.
Ohtawa, Shuzi, to Seiko Instruments & Electronics Ltd. Electronic timepiece driven by a plurality of stepping motors and powered by a solar cell. 4,702,613, Cl. 368-66.000.

Ohtsubo, Nobuhiro: *See*—
Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, 4,702,927, Cl. 426-467.000.
Ohuchi, Seiji: *See*—
Muguruma, Taku; and Ohuchi, Seiji, 4,703,304, Cl. 340-52.00R.
Oide, Masahiko: *See*—
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,681, Cl. 418-55.000.
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,682, Cl. 418-55.000.
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,683, Cl. 418-55.000.
Oizumi, Kouji: *See*—
Yamada, Yasuyuki; Sato, Yasuhisa; Nakayama, Hiroki; and Oizumi, Kouji, 4,702,581, Cl. 354-126.000.
Ojima, Juji; and Hino, Isao, to NHK Spring Co., Ltd. Tension providing device. 4,702,726, Cl. 474-101.000.
Okabe, Takao: *See*—
Goto, Makoto; Okabe, Takao; and Komori, Akihiro, 4,703,144, Cl. 219-69.00P.
Okada, Hideaki; and Irikura, Koji, to Kanzaki Kokyukoki Mfg. Co., Ltd. Key-shift transmission. 4,702,120, Cl. 74-371.000.
Okada, Isamu: *See*—
Nakayama, Toshiaki; Kohama, Tokio; Okada, Isamu; and Yokoyama, Tamio, 4,702,940, Cl. 427-244.000.
Okada, Koichi, to NEC Corporation. Method of X-ray lithography. 4,702,995, Cl. 430-311.000.
Okada, Nobuhide: *See*—
Yamamoto, Tsuyoshi; Okada, Nobuhide; and Kawamura, Yasuo, 4,703,393, Cl. 361-405.000.
Okada, Yasushi: *See*—
Hashimoto, Kenshiro; and Okada, Yasushi, 4,702,816, Cl. 204-406.000.
Okano, Keisuke, to Matsushita Electric Industrial Co., Ltd. Character pattern storage and display device. 4,703,320, Cl. 340-731.000.
Okanobu, Taiwa, to Sony Corporation. Tuning circuit apparatus. 4,703,292, Cl. 334-15.000.
Okazaki, Toshiharu: *See*—
Kato, Hisaaki; Yamaguchi, Shuuji; and Okazaki, Toshiharu, 4,702,515, Cl. 296-189.000.
Okimoto, Haruo: *See*—
Tadokoro, Tomoo; Okimoto, Haruo; and Akagi, Toshimichi, 4,702,219, Cl. 123-559.000.
Okubo, Yasumi; and Morino, Asami, to Amada Company, Limited. Wire EDM method for preventing wire lagging during machining of an angular corner and workpiece position control. 4,703,143, Cl. 219-69.00W.
Okuda, Tadashi: *See*—
Iguma, Akira; Okuda, Tadashi; Ieki, Kouichi; and Sasamoto, Toshio, 4,702,555, Cl. 350-247.000.
Okudaira, Sadao, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photographic lens with large aperture ratio. 4,702,568, Cl. 350-464.000.
Okui, Tokujiro, to Tomii, Uzo. Method of receiving small-sized electronic parts. 4,702,788, Cl. 156-252.000.
Okumoto, Ryoji: *See*—
Ukai, Mikio; and Okumoto, Ryoji, 4,702,483, Cl. 277-212.0FB.
Okumura, Eisuke; and Tsuno, Katsuhiko, to Kabushiki Kaisha Toshiba. Star scanner with semiconductor photosensitive elements having reticles. 4,703,167, Cl. 250-203.00R.
Okuno, Osamu: *See*—
Sato, Atsushige; Miura, Ishi; Kumei, Yasuhiro; Okuno, Osamu; Nakano, Tsuyoshi; and Yoshida, Bunsaku, 4,702,765, Cl. 75-0.50B.
Okuya, Hiroaki: *See*—
Fukuda, Tamotsu; Shigeta, Shiro; Okuya, Hiroaki; Kuroiwa, Yasuyuki; and Sudo, Tadashi, 4,702,910, Cl. 424-92.000.
Olbrich, Otto: *See*—
Biermeier, Johann; Olbrich, Otto; and Dierkes, Albert, 4,703,374, Cl. 360-98.000.
Oleson, John D.: *See*—
Dosaj, Vishu D.; Oleson, John D.; and Bokerman, Gary N., 4,702,902, Cl. 423-350.000.
Olins, Richard C., to Diesel Equipment Limited. Tailgate closure mechanism. 4,702,511, Cl. 296-57.00R.
Ollivier, Louis A., to Veriflo Corporation. Cylinder valve-regulator. 4,702,277, Cl. 137-613.000.
Olson, Gaylord, to Princeton Applied Research Corporation. Multiplexed wedge anode detector. 4,703,168, Cl. 250-207.000.
Olson, Hans E. E. Device for returning oil to at least one compressor in a cooling or refrigerating system. 4,702,089, Cl. 62-471.000.
Olympus Optical Co., Ltd.: *See*—
Imamura, Tatsuo; Yamamoto, Hiroyuki; and Yunoki, Yutaka, 4,703,380, Cl. 360-121.000.
Omaki, Takanobu: *See*—
Taniguchi, Nobuyuki; Omaki, Takanobu; Ishikawa, Norio; Nakai, Masaaki; Ishida, Tokuji; and Hamada, Masataka, 4,702,584, Cl. 354-400.000.
Omicioli, Florio F. Ventilated neck brace and related structures. 4,702,233, Cl. 128-75.000.
Omni Signal, Inc.: *See*—
Husmann, Robert J.; and Healy, Lawrence R., Jr., 4,703,313, Cl. 340-550.000.
Omniverse Research, Inc.: *See*—
Hayes, Peter F., 4,703,156, Cl. 219-136.000.
Omori, Kiyoshi: *See*—
Kawada, Hideaki; Ike, Kazuo; Nemoto, Tsuneo; and Omori, Kiyoshi, 4,703,384, Cl. 360-132.000.
Omori, Mitsugu: *See*—
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,703,095, Cl. 526-247.000.
Omori, Shunji: *See*—
Rokksku, Tadashi; Houzouji, Akira; Omori, Shunji; and Toto, Takayuki, 4,702,652, Cl. 409-84.000.
Omron Tateisi Electronics Co.: *See*—
Hisano, Atushi; Yamaguchi, Yoshinori; Masaki, Toshimichi; Saka, Kazuhiko; Nakatsuka, Nobuo; and Kato, Mitsutaka, 4,703,344, Cl. 358-60.000.
Inoue, Tadashi; and Matsuura, Tosimi, 4,703,414, Cl. 364-147.000.
Saka, Kazuhiko; Hisano, Atsushi; Kato, Michitaka; Masaki, Toshimichi; and Nakatsuka, Nobuo, 4,703,512, Cl. 382-22.000.
Omura, Koichi: *See*—
Yuasa, Hiroyoshi; and Omura, Koichi, 4,703,348, Cl. 358-133.000.
OMYA S.A.: *See*—
Cabannes, Claude, 4,702,114, Cl. 73-863.850.
Onal, Isik, to Signal Applied Technologies, Inc. Lead-tolerant catalyst system and method for treating exhaust gas containing lead compounds. 4,702,897, Cl. 423-213.500.
Onishi, Yasushi: *See*—
Kishi, Hajimu; Seki, Masaki; Takegahara, Takashi; and Onishi, Yasushi, 4,703,415, Cl. 364-170.000.
Ono, Fuminobu: *See*—
Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.
Ono, Kenji; and Nobutoki, Kazuhiro, to Matsushita Electric Works, Ltd. Polarized electromagnetic actuator device. 4,703,293, Cl. 335-80.000.
Ono, Shigeo: *See*—
Sejimo, Akinobu; and Ono, Shigeo, 4,702,867, Cl. 264-25.000.
Ontario Research Foundation: *See*—
Mulholland, D. Lindsay; and Sheppard, John D., 4,703,007, Cl. 435-161.000.
Oosaka, Shigenori, to Fuji Photo Film Co., Ltd. Device for loading or unloading magnetic disc pack. 4,703,373, Cl. 360-97.000.
Oppelt, Arnulf: *See*—
Loeffler, Wilfried; and Oppelt, Arnulf, 4,703,271, Cl. 324-309.000.
Oppermann, Gunter: *See*—
Goossens, John; Oppermann, Gunter; and Grape, Wolfgang, 4,702,855, Cl. 252-75.000.
Optical Coating Laboratory, Inc.: *See*—
Phillips, Roger W.; Shevlin, Craig M.; and Matteucci, John S., 4,702,963, Cl. 428-426.000.
Orain, Michel A., to Glaenzer Spicer. Homokinetic joint having pivotable jaws with complementary sets of teeth for conjugate pivotal movement thereof. 4,702,723, Cl. 464-120.000.
Orii, Makoto; and Hayashi, Katsuhiko, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Spring drive device. 4,702,350, Cl. 185-39.000.
Orikawa, Michihiro: *See*—
Uno, Takaaki; Dan, Takuya; and Orikawa, Michihiro, 4,702,346, Cl. 181-207.000.
Orlova, Nadezhda P.: *See*—
Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.
Ortalli, Patrice: *See*—
Frappe, Gerard; and Ortalli, Patrice, 4,703,250, Cl. 323-317.000.
Ortho Pharmaceutical Corporation: *See*—
Press, Jeffery B., 4,703,120, Cl. 544-278.000.
Osborn, Ronnie M.: *See*—
Oswald, Norman D.; Mankey, Harry S.; Franklin, Carl M.; Wilhelm, James M.; and Osborn, Ronnie M., 4,702,843, Cl. 280-707.000.
Osborne, Edward L., to Westvaco Corporation. Tray with reinforced corners. 4,702,409, Cl. 229-125.000.
Oseman, Gavin S., to Dowty Seals Limited. Sealing assembly with elastomeric energizing means. 4,702,482, Cl. 277-165.000.
O'Shea, Norman E.: *See*—
Kwitkowski, Peter A.; Nanni, Peter; Missele, Carl; O'Shea, Norman E.; and Pirih, Anthony M., 4,703,289, Cl. 333-1.100.
Oshiage, Katsunori, to Nissan Motor Co., Ltd. Ratio control system for continuously variable transmission. 4,702,128, Cl. 74-866.000.
Ostergren, Raymond R. Game set of dyadic articles. 4,702,476, Cl. 273-1.00E.
Ostertag, Werner; Wienand, Henning; and Bauer, Roland, to BASF Aktiengesellschaft. Preparation of magnetite pigments: control of particle size. 4,702,775, Cl. 106-304.000.
Oswald, Norman D.; Mankey, Harry S.; Franklin, Carl M.; Wilhelm, James M.; and Osborn, Ronnie M., to Standard Manufacturing Co., Inc. Control system for an adverse terrain vehicle. 4,702,843, Cl. 280-707.000.
Ota, Matsuo: *See*—
Minami, Hirokazu; Ishizu, Nobuhiko; and Ota, Matsuo, 4,702,191, Cl. 114-106.000.
Otis Engineering Corporation: *See*—
Gano, John C.; Schwendemann, Kenneth L.; Noack, Timothy J.; and Godfrey, Craig W., 4,702,320, Cl. 166-343.000.

Otomura, Satoshi; and Kojima, Narihito, to Ricoh Co., Ltd. Method of forming image. 4,702,979, Cl. 430-52.000.

Otter, Fred A., Jr.: *See*—
Nighan, William L.; and Otter, Fred A., Jr., 4,703,229, Cl. 315-169.400.

Otto, Karl L.: *See*—
Reuss, Oswald; and Otto, Karl L., 4,702,708, Cl. 439-83.000.

Oura, Toshiyuki: *See*—
Hoshi, Akio; and Oura, Toshiyuki, 4,702,371, Cl. 206-328.000.

Overath, Friedhelm: *See*—
Mueller, Wilhelm; Overath. Friedhelm; and Weyer, Michael, 4,702,498, Cl. 285-55.000.

Overton, V. Parker. Glove. 4,701,963, Cl. 2-161.00A.

Ovil, Yoel; and Levy, Morris, to Galil Advanced Technologies Ltd. Surgical implement particularly useful for suturing prosthetic valves. 4,702,250, Cl. 128-334.00R.

Ovonic Synthetic Materials Company, Inc.: *See*—
Allred, David; Kadin, Alan; and Pai, Purnachandra, 4,702,955, Cl. 428-213.000.

Ovshinsky, Stanford R.; and Madan, Arun, to Energy Conversion Devices, Inc. Photodetection and current control devices. 4,703,336, Cl. 357-30.000.

Owens, Phillip M., to Glidden Company, The. Stabilized aqueous coatings containing zinc oxide. 4,703,071, Cl. 523-403.000.

Owens, Thomas M.; Wagner, Thomas J.; and Mrazek, William C., Jr., to Ralston Purina Company. Dried meat containing coating. 4,702,924, Cl. 426-92.000.

Oy Tampella AB: *See*—
Heinonen, Jarmo; Wisakanto, Risto; and Strom, Rolf, 4,702,621, Cl. 384-37.000.
Salmi, Pekka; and Muuttonen, Timo, 4,702,326, Cl. 173-104.000.

Oy Wartsila Ab: *See*—
Heideman, Torsten; Levander, Kai; and Salmi, Pekka, 4,702,187, Cl. 114-40.000.

Oyamoto, Toshiya; Makino, Katsuaki; and Ogawara, Fumio, to Mitsubishi Jukogyo Kabushiki Kaisha; and Nippon Kokan. Process for recovering heat of a tar-containing high-temperature gas. 4,702,818, Cl. 208-81.000.

Ozaki, Hiroji: *See*—
Nakajima, Masayuki; Sato, Shinichi; Tokui, Akira; Kawai, Akira; Nagatomo, Masao; and Ozaki, Hiroji, 4,702,796, Cl. 156-653.000.

Ozaki, Minoru; and Tanaka, Kunimaro, to Mitsubishi Denki Kabushiki Kaisha. PCM signal transmission system. 4,703,494, Cl. 375-19.000.

Ozawa, Norio: *See*—
Takeoka, Yoshikatsu; Ozawa, Norio; and Yasuda, Nobuaki, 4,702,991, Cl. 430-270.000.

Ozawa, Takurou: *See*—
Tsutsumi, Sunsaku; and Ozawa, Takurou, 4,702,117, Cl. 74-89.170.

Ozu, Masao, to Kabushiki Kaisha Toshiba. Compressor for reversible refrigeration cycle. 4,702,088, Cl. 62-324.100.

Pace, Salvatore J.: *See*—
Bock, Jan; Valint, Paul L.; and Pace, Salvatore J., 4,702,319, Cl. 166-275.000.

Pacific Scientific Company: *See*—
Yang, Elmer C., 4,702,353, Cl. 188-135.000.

Packaging Resources Inc.: *See*—
Wombold, Harry A. E., 4,702,387, Cl. 220-270.000.

Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, to Webasto-Werk W. Baier GmbH & Co.; and Daimler-Benz Aktiengesellschaft. Sliding and lifting vehicle roof with a sliding canopy provided with flexible screens. 4,702,518, Cl. 296-217.000.

Pagliai, Ferro D.; and Luchsinger, Pedro W. Agitator regulator valve. 4,702,416, Cl. 239-11.000.

Pagliaro, Ernest H., to Fairprene Industrial Products Company, Inc. Composite vacuum bag material having breather surface. 4,702,376, Cl. 206-524.800.

Pai, Purnachandra: *See*—
Allred, David; Kadin, Alan; and Pai, Purnachandra, 4,702,955, Cl. 428-213.000.

Pak, Chong-Il. Apparatus for removing individual wafer segments from a framed carrier. 4,702,365, Cl. 198-461.000.

Palau, Joseph; and Bassi, Dario, to Etablissments Staubli-Verdol. Shed forming devices in weaving looms including pivotable retaining [illegible]ks. 4,702,286, Cl. 139-455.000.

[illegible], Reinhard, to Robert Bosch GmbH. Method of testing control [illegible]s. 4,703,258, Cl. 324-73.00R.

Pall Corporation: *See*—
Degen, Peter J.; Joffee, Irving B.; and Gsell, Thomas C., 4,702,840, Cl. 210-638.000.
Pall, David B.; Degen, Peter J.; Gsell, Thomas C.; and Yanakis, Eleni C., 4,702,947, Cl. 428-36.000.

Pall, David B.; Degen, Peter J.; Gsell, Thomas C.; and Yanakis, Eleni C., to Pall Corporation. Fibrous structure and method of manufacture. 4,702,947, Cl. 428-36.000.

Palla, Ottorino: *See*—
Camaggi, Giovanni; Gozzo, Franco; Signorini, Ernesto; and Palla, Ottorino, 4,702,762, Cl. 71-90.000.

Pallet Master, Inc.: *See*—
Davidson, Delma; and Waechter, Thomas R., 4,702,137, Cl. 83-718.000.

Palm, George R. Line storage container. 4,702,035, Cl. 43-57.100.

Palmer, Clarence K., to PNC, Inc. Method of making sealed housings containing delicate structures. 4,701,999, Cl. 437-211.000.

Palmer, Gary E.; and Todd, Mike J., to Hako Minuteman, Inc. High speed floor burnisher. 4,701,976, Cl. 15-385.000.

Palmin, Simyon; and Hewson, Brian, to Design Components, Incorporated. Amplifier system for D.C. motor. 4,703,238, Cl. 318-563.000.

Panagiotou, George N.: *See*—
Helton, Charles J., III; and Panagiotou, George N., 4,703,404, Cl. 362-294.000.

Panaitescu, Nicolita: *See*—
Stoian, Anatol; Panaitescu, Nicolita; and Tuliu, Marioara, 4,702,487, Cl. 208-390.000.

Papst-Motoren GmbH & Co. KG: *See*—
Wrobel, Guenter, 4,703,209, Cl. 310-67.00R.

Paquette, Daniel. Combination hand weight and water dispenser. 4,702,473, Cl. 272-117.000.

Parker, David J.: *See*—
Briggs, Stuart J.; Parker, David J.; and Schluter, Peter, 4,702,078, Cl. 60-585.000.
Lilley, Eric M.; and Parker, David J., 4,702,077, Cl. 60-578.000.

Parker Hannifin Corporation: *See*—
Allen, Kenneth C., Jr.; and Findlay, Robert H., 4,702,273, Cl. 137-487.500.
Badoureaux, Jean-Pierre, 4,702,278, Cl. 137-614.050.
Jelinek, Jerry G., 4,702,657, Cl. 411-369.000.
Viola, Frank J., 4,702,109, Cl. 73-440.000.

Parker, Lorne A., to 1K Entertainment Center Ltd. Method and apparatus for producing an audio magnetic tape recording from a preselected music library. 4,703,465, Cl. 369-30.000.

Parker Pen (Benelux) B.V.: *See*—
Herold, Gerald C.; and Jung, Harley A., 4,702,634, Cl. 401-53.000.

Parker Pen Company, The: *See*—
Schmidt, Gunther, 4,702,633, Cl. 401-34.000.

Parker, Robert. Battery tester including textile substrate. 4,702,563, Cl. 350-351.000.

Parker, Robert. Battery tester including flexible substrate and polyacetilynic material. 4,702,564, Cl. 350-351.000.

Parks, Beryl H.: *See*—
Weiland, Lynne E.; and Parks, Beryl H., 4,702,881, Cl. 376-442.000.

Parsons, John P.: *See*—
Barclay, John A.; Stewart, Walter F.; Prenger, F. Coyne; Zimm, Carl B.; and Parsons, John P., 4,702,090, Cl. 62-3.000.

Patel, Arvind M., to International Business Machines Corporation. Method and apparatus for computing and implementing error detection check bytes. 4,703,485, Cl. 371-37.000.

Patel, Chandrakant B.: *See*—
Balaban, Alvin R.; Harwood, Leopold A.; Patel, Chandrakant B.; and Demmer, Walter H., 4,703,340, Cl. 358-19.000.

Patterson, Robert P.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.

Paul-Munroe Hydraulics, Inc.: *See*—
Raymont, John M., Jr., 4,702,105, Cl. 73-168.000.

Paul, Reiner: *See*—
Rasshofer, Werner; Paul, Reiner; Seel, Klaus; and Weber, Christian, 4,703,100, Cl. 528-66.000.

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Ulveing, Leon; Linden, Joseph; Bohnet, Matthias; Wies, Georges; and Mack, Raymond, 4,702,182, Cl. 110-347.000.
Ulveling, Leon; Schmit, Louis; and Legille, Edouard, 4,702,288, Cl. 141-67.000.

Pauli, George B.: *See*—
Smith, Donald C.; Snow, Richard F.; and Pauli, George B., 4,703,403, Cl. 362-268.000.

Paulsson, Bjorn N. P., to Chevron Research Company. Nondestructive downhole seismic vibrator source and processes of utilizing the vibrator to obtain information about geologic formations. 4,702,343, Cl. 181-106.000.

Paur, Konrad: *See*—
Brumme, Gerhard; and Paur, Konrad, 4,703,490, Cl. 372-86.000.

Payne, Kathryn L., to Dowell Schlumberger Incorporated. Control of crosslinking reaction rate using organozirconate chelate crosslinking agent and aldehyde retarding agent. 4,702,848, Cl. 252-8.551.

PCB Sandpiper, Inc.: *See*—
Mazur, Duane J.; and Weinberg, Norman L., 4,702,894, Cl. 204-73.00R.

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Matlock, Dyer A.; Lichtel, Richard L., Jr.; and Pearce, Lawrence G., 4,702,000, Cl. 437-63.000.

Pedrazzi, Renato: *See*—
Aldrovandi, Mauro; Cianciavicchia, Domenico; and Pedrazzi, Renato, 4,702,675, Cl. 417-63.000.

Peinecke, Dale R.; Robak, Casimir B., Jr., and Dubs, Robert A., to Aluminum Company of America. Control system for positioning and operating a pneumatic percussion tool. 4,702,324, Cl. 173-39.000.

Peiretti, Domenico: *See*—
Ribolla, G. Carlo; Taroni, Federico; Peiretti, Domenico; and Pepino, Antonio, 4,701,985, Cl. 26-10.00C.

Pelko Electric Inc.: *See*—
Pelonis, Kosta, 4,703,153, Cl. 219-370.000.

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Pelta, Samuel, to Pilling Co. Adapter for surgical retractor. 4,702,230, Cl. 128-20.000.

Penar, Leonard. Smoke detector mounting. 4,702,452, Cl. 248-317.000.

Penev, Penyo I.: *See*—
Bakalov, Nikolay G.; Penev, Penyo I.; Ivanov, Ivan K.; Velev, Velyo T.; Savov, Peter H.; and Vulchev, Alexander Y., 4,703,493, Cl. 373-95.000.

Penicaud, Etienne: *See*—
Petit, Andre ; Penicaud, Etienne; Le Coz, Gerard; and Jamet, Daniel, 4,703,394, Cl. 361-413.000.

Pennison, Robert A.: *See*—
Golwas, Robert F.; Pennison, Robert A.; and Eckman, Richard E., 4,702,650, Cl. 408-6.000.

Penny, Glenn S., to Halliburton Company. Method of increasing hydrocarbon production from subterranean formations. 4,702,849, Cl. 252-8.554.

Pepino, Antonio: *See*—
Ribolla, G. Carlo; Taroni, Federico; Peiretti, Domenico; and Pepino, Antonio, 4,701,985, Cl. 26-10.00C.

Pepka, James M.: *See*—
Wilson, John F.; Seel, David D.; and Pepka, James M., 4,702,883, Cl. 376-446.000.

Pepper, Steven H., to Tektronix, Inc. Power failure indicator. 4,703,410, Cl. 363-56.000.

Perez, Fernando. Container for collecting oil. 4,702,290, Cl. 141-332.000.

Perfluktiv Technik AG: *See*—
Sundermann, Erich; Reye, Hans; and Abel, Otto, 4,703,032, Cl. 502-413.000.

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Brunner, Timothy A., 4,703,434, Cl. 364-488.000.

Perloff, David S.; and Mallory, Chester, to Prometrix Corporation. Apparatus and methods for resistivity testing. 4,703,252, Cl. 324-62.000.

Perrott, Francis C. Vehicle supported in cantilever fashion and switching of at rail divergent junctions. 4,702,173, Cl. 104-130.000.

Perry, Arthur H. Sliding door. 4,702,514, Cl. 296-146.000.

Personnet, Pierre-Bernard; and Philbert, Jean-Michel, to Uranium Pechiney. Pretreatment by alkaline wetting and holding at temperature of natural materials having an argillaceous gangue containing combustible elements. 4,702,820, Cl. 208-424.000.

Pesque, Patrick: *See*—
Nicolas, Jean-Marie; and Pesque, Patrick, 4,702,258, Cl. 128-660.000.

Peter Eckes KG mbH: *See*—
Wiesenberger, Alfred; Schildmann, Jens A.; Kolb, Erich; and Dechent, Hans-Mario, 4,702,922, Cl. 426-51.000.

Petersen, Uwe; Grohe, Klaus; Zeiler, Hans-Joachim; and Metzger, Karl G., to Bayer Aktiengesellschaft. 1-Cyclopropyl-1,4-dihydro-4-oxo-7-(4-(2-oxo-1,3-dioxol-4-yl-methyl)-1-piperazinyl)-3-quinolinecarboxylic acid antibacterial agents. 4,703,047, Cl. 514-254.000.

Peterson, Larry O., to Crimestopper Security Products, Inc. Electric Solenoid operation vehicle hood lock. 4,702,094, Cl. 70-241.000.

Petit, Andre ; Penicaud, Etienne; Le Coz, Gerard; and Jamet, Daniel, to Alcatel. System for interconnecting orthogonally disposed printed circuit boards and switching networks employing same. 4,703,394, Cl. 361-413.000.

Petri, Volker: *See*—
Andres, Rudolf; Knoll, Heinz; Petri, Volker; and Pfistner, Harald, 4,702,492, Cl. 280-801.000.

Petrillo, Edward W., Jr.: *See*—
Karanewsky, Donald S.; and Petrillo, Edward W., Jr., 4,703,043, Cl. 514-80.000.

Pettigrew, Robert M.; Gardner, Keith; and Longman, Robert J., to Plasmon Data Systems, P.V. Optical data recording using radiation of different characteristics. 4,703,469, Cl. 369-101.000.

Peyman, Gholam: *See*—
Koziol, Jeffrey E.; and Peyman, Gholam, 4,702,865, Cl. 264-17.000.

Pfeiffer, Ugo: *See*—
Pinza, Mario; Farina, Carlo; Banfi, Silvano; and Pfeiffer, Ugo, 4,703,054, Cl. 514-386.000.

Pfistner, Harald: *See*—
Andres, Rudolf; Knoll, Heinz; Petri, Volker; and Pfistner, Harald, 4,702,492, Cl. 280-801.000.

Pfizer Inc.: *See*—
Volkmann, Robert A., 4,703,052, Cl. 514-337.000.

Pforzheimer Uhren-Rohwerke PORTA G.m.b.H: *See*—
Burkhardt, Wolfgang; and Kroner, Wolfgang, 4,703,208, Cl. 310-49.00R.

Pham, Ngu T., to Thomson-CSF. Logic coincidence gate and logic sequential circuits using said coincidence gate. 4,703,204, Cl. 307-448.000.

Pharmindev Ltd.: *See*—
Cosentino, Roberto F.; and Bonapace, Franco B., 4,702,932, Cl. 427-33.000.

Phelan, Gerald E. Windrow shaping apparatus. 4,702,062, Cl. 56-192.000.

Phelps, Weldon L.: *See*—
Mueller, James P.; and Phelps, Weldon L., 4,702,358, Cl. 192-13.00R.

Philbert, Jean-Michel: *See*—
Personnet, Pierre-Bernard; and Philbert, Jean-Michel, 4,702,820, Cl. 208-424.000.

Philbrick, John B.: *See*—
Edwards, John R.; Popov, George D.; and Philbrick, John B., 4,703,376, Cl. 360-105.000.

Philiffe J. H. Berna: *See*—
Brovelli, Jacques C. J., 4,703,194, Cl. 307-116.000.

Phillips, Cecil L., to Scott Badar Co., Ltd. Repairing utility poles. 4,702,057, Cl. 52-514.000.

Phillips Petroleum Company: *See*—
Blackwell, Jennings P.; and Beever, William H., 4,703,081, Cl. 524-592.000.
Bresson, Clarence R.; and Mark, Harold W., 4,702,821, Cl. 209-166.000.
Tieszen, Dale O.; and Dix, James S., 4,703,088, Cl. 525-189.000.

Phillips, Roger W.; Shevlin, Craig M.; and Matteucci, John S., to Optical Coating Laboratory, Inc. Flexible polymer film with vapor impermeable coating. 4,702,963, Cl. 428-426.000.

Phillocraft Company: *See*—
Lukens, J. Paul, Jr., 4,702,664, Cl. 414-676.000.

Philosophe, Isidore, to Cinram Ltd./Ltee. Storage container for records or the like. 4,702,369, Cl. 206-312.000.

Photon Devices, Ltd.: *See*—
Margolin, George D., 4,702,552, Cl. 350-96.250.

Phuc, Tran N., to Senko Medical Instrument Mfg. Co. Ltd. Oscillator for ventilation apparatus for artificial respirator. 4,702,678, Cl. 417-360.000.

Picker International, Inc.: *See*—
Holland, G. Neil, 4,703,275, Cl. 324-318.000.

Picker International, Ltd.: *See*—
Gyngell, Michael L.; and Nayler, Graham L., 4,703,268, Cl. 324-309.000.
Young, Ian R., 4,703,269, Cl. 324-309.000.

PictureTel Corporation: *See*—
Bernstein, Jeffrey G., 4,703,349, Cl. 358-133.000.
Hinman, Brian L., 4,703,350, Cl. 358-133.000.

Pidsosny, Richard A.: *See*—
Porter, Frederick J.; and Pidsosny, Richard A., 4,703,198, Cl. 307-473.000.

Pierce, Keith: *See*—
Popeski, Fred; and Pierce, Keith, 4,702,480, Cl. 273-384.000.

Piezo Electric Products, Inc.: *See*—
Carter, Robert E.; and Murphy, Donald R., 4,702,418, Cl. 239-101.000.

Pilenvik, Goran S.: *See*—
Broddner, Sven M.; Bromster, Leif; Lundell, Ulf; and Pilenvik, Goran S., 4,702,242, Cl. 128-205.130.

Pilkington plc: *See*—
Jones, David W.; and Elston, Malcolm, 4,703,328, Cl. 343-704.000.

Pilling Co.: *See*—
Pelta, Samuel, 4,702,230, Cl. 128-20.000.

Pinza, Mario; Farina, Carlo; Banfi, Silvano; and Pfeiffer, Ugo, to ISF, S.p.A. Nootropic imidazolidinones. 4,703,054, Cl. 514-386.000.

Pioneer/Eclipse Corp.: *See*—
Wilson, William H., 4,701,970, Cl. 15-98.000.

Pioneer Electronic Corporation: *See*—
Konno, Yoshikiyo, 4,703,466, Cl. 369-45.000.
Kosaka, Minoru; and Banno, Tutomu, 4,703,367, Cl. 358-339.000.
Moriyama, Yoshiaki; and Hosaka, Sumio, 4,703,369, Cl. 358-343.000.
Sueyoshi, Susumu; Tokui, Satoru; and Nanba, Keiichiro, 4,703,450, Cl. 364-900.000.
Sugai, Yoshiro; and Kimura, Hiroyuki, 4,703,501, Cl. 381-10.000.

Piper, Dale R.: *See*—
Boehmer, Dennis A.; and Piper, Dale R., 4,702,386, Cl. 220-86.00R.

Pirelli Cable Corporation: *See*—
Marciano-Agostinelli, Fabrizio; and Barbaro-Forleo, Marco, 4,703,132, Cl. 174-23.00C.

Pirih, Anthony M.: *See*—
Kwitkowski, Peter A.; Nanni, Peter; Missele, Carl; O'Shea, Norman E.; and Pirih, Anthony M., 4,703,289, Cl. 333-1.100.

Pitner, Homer S., Jr.: *See*—
Chan, John R.; and Pitner, Homer S., Jr., 4,703,375, Cl. 360-105.000.

Pitney Bowes Inc.: *See*—
Hubbard, David W., 4,703,333, Cl. 346-140.00R.
Muller, Arno, 4,702,164, Cl. 101-91.000.

Pittinger, Charles B., Jr.: *See*—
Pittinger, Charles B., Sr.; Pittinger, Cynthia A.; and Pittinger, Charles B., Jr., 4,702,005, Cl. 30-276.000.

Pittinger, Charles B., Sr.; Pittinger, Cynthia A.; and Pittinger, Charles B., Jr. Apparatus for cutting vegetation with incremental feeding of cutting filament. 4,702,005, Cl. 30-276.000.

Pittinger, Cynthia A.: *See*—
Pittinger, Charles B., Sr.; Pittinger, Cynthia A.; and Pittinger, Charles B., Jr., 4,702,005, Cl. 30-276.000.

Piwonka, Peter: *See*—
Kalt, Glenda; Straub, Dale K.; and Piwonka, Peter, 4,702,736, Cl. 604-180.000.

Pizzino, Joanne L. Dual dose syringe. 4,702,737, Cl. 604-191.000.

Plante, Leo J.: *See*—
Rattray, Kendrick D.; and Plante, Leo J., 4,703,224, Cl. 313-487.000.

Plasmon Data Systems, P.V.: *See*—
Pettigrew, Robert M.; Gardner, Keith; and Longman, Robert J., 4,703,469, Cl. 369-101.000.

Plus Development Corporation: *See*—
Hahn, Peter S.; Stone, Thomas R.; Moon, William G.; and Harrison, Joel N., 4,703,176, Cl. 250-221.08E.

PNC, Inc.: *See*—
Palmer, Clarence K., 4,701,999, Cl. 437-211.000.

Poeschel, Eva: *See—*
Heide, Helmut; Etzkorn, Heinz-Werner; Poeschel, Eva; and Steininger, Helmut, 4,702,930, Cl. 427-2.000.
Pogue, Glenn J., to Rotex, Inc. Screen cleaner for particle size analyzer. 4,702,826, Cl. 209-237.000.
Pohedra, Joseph J.: *See—*
Beckwith, Paul B.; Bistarkey, Donald S.; Pohedra, Joseph J.; and Trimble, Donald E., 4,702,698, Cl. 434-2.000.
Polaroid Corporation: *See—*
Hammerton, Denis, 4,702,102, Cl. 73-19.000.
Polaschegg, Hans-Dietrich; and Mathieu, Bernd, to Fresenius AG. Hemodiafiltration apparatus. 4,702,829, Cl. 210-195.200.
Poling, Ronald W., to General Electric Company. Electric circuit controlling device. 4,703,140, Cl. 200-83.00P.
Pollard, Brian J., to Northern Telecom Limited. Power amplifier. 4,703,500, Cl. 379-252.000.
Pollastro, Giovanni, to Riv-Skf Officine Di Villar Perosa S.p.A. Bearing ball spacing retainer. 4,702,627, Cl. 384-526.000.
Pollich, Gerhard, to Heidelberger Druckmaschinen AG. Device in the delivery of sheet-fed rotary printing machine for exhibiting curl formation on the leading edge of a delivered sheet. 4,702,468, Cl. 271-195.000.
Pollich, Gerhard: *See—*
Jeschke, Willi; and Pollich, Gerhard, 4,702,469, Cl. 271-227.000.
Polster, Louis S. Food press. 4,702,159, Cl. 99-349.000.
Polysar Limited: *See—*
Thompson, Ronald J., 4,702,944, Cl. 427-389.800.
Pontiff, Thomas M.; and Collins, Frederick H., to Valcour Incorporated. Moldable silane-crosslinked polyolefin foam beads. 4,702,868, Cl. 264-50.000.
Popeski, Fred; and Pierce, Keith. Flushing booth target apparatus. 4,702,480, Cl. 273-384.000.
Popov, George D.: *See—*
Edwards, John R.; Popov, George D.; and Philbrick, John B., 4,703,376, Cl. 360-105.000.
Popova, Roza A.: *See—*
Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.
Pora, Tom; and Grandinetti, Tony, to Ball Corporation. Redraw carriage assembly and slide mount. 4,702,098, Cl. 72-351.000.
Porcher, Pierre O. Ski boot. 4,702,022, Cl. 36-119.000.
Porowski, Jan S.; Badlani, Manu L.; O'Donnell, William J.; and Hampton, Edward J., to O'Donnell & Associates, Inc. Process for improving resistance of split pins to stress corrosion cracking. 4,702,880, Cl. 376-305.000.
Porter, Frederick J.; and Pidsosny, Richard A., to Ford Motor Company. Bi-directional data transfer circuit that is directionally responsive to the impedance condition of an associated input/output port of a microcomputer. 4,703,198, Cl. 307-473.000.
Posfai, Gyorgy: *See—*
Boros, Imre; Venetianer, Pal; and Posfai, Gyorgy, 4,703,012, Cl. 435-320.000.
Potenza, Marcello: *See—*
Di Vita, Pietro; and Potenza, Marcello, 4,703,488, Cl. 372-44.000.
Pottharst, Jurgen: *See—*
Zondler, Rolf; and Pottharst, Jurgen, 4,702,559, Cl. 350-331.00R.
Power Group International Corp.: *See—*
Gottfried, Mario H., 4,703,188, Cl. 290-38.00B.
Powers, Samuel L.: *See—*
Banasiak, Joseph; and Powers, Samuel L., 4,702,479, Cl. 273-148.00R.
Powers, Thomas, Jr.: *See—*
Lawrie, William E.; Powers, Thomas, Jr.; and Brophy, Joseph W., 4,702,112, Cl. 73-629.000.
Powers, Whitney R.; and Sisun, Henry, to Boston University, Trustees of. Electrodes, electrode assemblies, methods, and systems for tissue stimulation and transdermal delivery of pharmacologically active ligands. 4,702,732, Cl. 604-20.000.
Powlenko, Edward J., to Mead Corporation, The. Bulk bin. 4,702,408, Cl. 229-101.000.
Poyser, John: *See—*
Lehn, Carsten J.; and Poyser, John, 4,702,929, Cl. 426-635.000.
PPG Industries, Inc.: *See—*
Singer, Debra L.; Dowbenko, Rostyslaw; and Simpson, Dennis A., 4,703,101, Cl. 528-87.000.
Prange, Patrick E.: *See—*
Morganti, Victor M.; and Prange, Patrick E., 4,703,417, Cl. 364-200.000.
Pre-Melt Systems, Inc.: *See—*
Areauz, Larry D.; and Dudley, Robert H., 4,702,768, Cl. 75-65.00R.
Preh, Elektrofeinmechanische Werke, Jakob Preh, Nachf, GmbH & Co.: *See—*
Reuss, Oswald; and Otto, Karl L., 4,702,708, Cl. 439-83.000.
Prenger, F. Coyne: *See—*
Barclay, John A.; Stewart, Walter F.; Prenger, F. Coyne; Zimm, Carl B.; and Parsons, John P., 4,702,090, Cl. 62-3.000.
Prentice, Mark E., to Avon Industrial Polymers Limited. Attachment of skirt pants for surface-effect vehicles. 4,702,332, Cl. 180-127.000.
Presentation Technologies, Inc.: *See—*
Baker, Philip G.; and Yurchenco, James, 4,702,578, Cl. 354-15.000.
President Engineering Corporation: *See—*
Burger, Rainer, 4,702,785, Cl. 156-91.000.
Press, Jeffery B., to Ortho Pharmaceutical Corporation. Furo(3,4-d)pyrimidine-2,4-dione derivatives and intermediates thereof. 4,703,120, Cl. 544-278.000.
Press-Seal Gasket Corporation: *See—*
Skinner, Harry W.; Skinner, James W.; O'Donnell, William P.; and Skinner, William O., 4,702,645, Cl. 405-154.000.
Prestridge, Floyd L.; and Johnson, Bruce C., to National Tank Company. Distributed charge composition electrodes and desalting system. 4,702,815, Cl. 204-302.000.
Priam (Delaware) Corporation: *See—*
Castagna, Joseph T.; and McEligot, Sean, 4,703,470, Cl. 369-215.000.
Hazebrouck, Henry B., 4,703,377, Cl. 360-106.000.
Price, Anthony G.; and Campbell, Roy, to Lucas Industries Public Limited Co. Self-energizing disc brakes. 4,702,351, Cl. 188-71.400.
Princeton Applied Research Corporation: *See—*
Olson, Gaylord, 4,703,168, Cl. 250-207.000.
Pro-Mark Corporation: *See—*
Brochstein, Irwin H., 4,702,143, Cl. 84-422.00S.
Procter & Gamble Company, The: *See—*
Gosselink, Eugene P., 4,702,857, Cl. 252-174.210.
Prohaska, Hans, to SWF Auto-Electric GmbH. Windshield wiper system. 4,701,971, Cl. 15-250.210.
Prometrix Corporation: *See—*
Perloff, David S.; and Mallory, Chester, 4,703,252, Cl. 324-62.000.
ProQuip, Inc.: *See—*
Abbe, David C.; and Burt, George A., Jr., 4,702,101, Cl. 73-1.00R.
Prudhomme, Pierre: *See—*
Bouteille, Daniel; Nicolas, Michel; and Prudhomme, Pierre, 4,702,276, Cl. 137-580.000.
Prunesti, James; Bell, William D.; Gannaway, Jane P.; O'Boyle, Dolores; and Tedeschi, Anthony, to International Playtex, Inc. Garment having additional support to selected portions. 4,701,964, Cl. 2-406.000.
PUMA AG Rudolf Dassler Sport (formerly PUMA-Sportschuhfabriken Rudolf Dassler KG): *See—*
Dassler, Armin A., 4,703,445, Cl. 364-561.000.
Purcell, John R.: *See—*
Selvaggi, Jerry A.; and Purcell, John R., 4,702,825, Cl. 209-224.000.
Pyzik, Aleksander J.; and Aksay, Ilhan A., to Washington Research Foundation. Multipurpose boron carbide-aluminum composite and its manufacture via the control of the microstructure. 4,702,770, Cl. 75-236.000.
Q.P. Corporation: *See—*
Ueda, Tsunesuke, 4,702,921, Cl. 426-48.000.
Quan, Zoe S.: *See—*
Dretzka, Ellen E.; Quan, Zoe S.; and Schreiner, Philip A., 4,703,475, Cl. 370-60.000.
R. A. Jones & Co. Inc.: *See—*
Benner, Harold T., Jr.; Leonhardt, Mark A.; and Zdinak, Matthew J., 4,702,289, Cl. 141-125.000.
R. E. Dietz Co.: *See—*
Vescio, Donald W.; and Latham, Daniel S., 4,703,400, Cl. 362-80.000.
R. J. Reynolds Tobacco Company: *See—*
Graves, William H., Jr., 4,702,264, Cl. 131-370.000.
Raasch, Hans, to W. Schlafhorst & Co. Coil producing machine. 4,702,427, Cl. 242-35.50A.
Rachman, Isadore B., to U-Seal-It Vending Co., Inc. Vending machine. 4,702,392, Cl. 221-151.000.
Radovich, John M.: *See—*
Yunker, Stanley B.; and Radovich, John M., 4,703,010, Cl. 435-173.000.
Rajaram, Babu: *See—*
Krause, Charles A.; Rajaram, Babu; and Watzman, Barry A., 4,703,419, Cl. 364-200.000.
Rajotte, Paul T.: *See—*
Morris, Robert A.; and Rajotte, Paul T., 4,702,002, Cl. 29-837.000.
Ralph, James L. Grill structure. 4,702,055, Cl. 52-456.000.
Ralston Purina Company: *See—*
Owens, Thomas M.; Wagner, Thomas J.; and Mrazek, William C., Jr., 4,702,924, Cl. 426-92.000.
Randall, David: *See—*
Brown, James P.; May, Ronald N.; and Randall, David, 4,703,069, Cl. 521-174.000.
Raney, Ty A.: *See—*
Cusick, Joseph B., III; and Raney, Ty A., 4,702,539, Cl. 439-588.000.
Rank Cintel Ltd.: *See—*
Mumford, Ronald W. J., 4,703,365, Cl. 358-293.000.
Ransburg-Gema AG: *See—*
Rath, Gnton, deceased, 4,702,420, Cl. 239-391.000.
Raskmark, Povl: *See—*
Andersen, Jorgen B.; and Raskmark, Povl, 4,702,262, Cl. 128-804.000.
Rasshofer, Werner; Paul, Reiner; Seel, Klaus; and Weber, Christian, to Bayer Aktiengesellschaft. Process for the production of polyisocyanates containing urea and/or biuret groups, preparations obtainable thereby and their use. 4,703,100, Cl. 528-66.000.
Rath, Gnton, deceased (by Rath, Margaret, heir), to Ransburg-Gema AG. Spray gun for coating material. 4,702,420, Cl. 239-391.000.
Rath, Margaret, heir: *See—*
Rath, Gnton, deceased, 4,702,420, Cl. 239-391.000.
Rattray, Kendrick D.; and Plante, Leo J., to GTE Products Corporation. Fluorescent lamp substantially approximating the ultraviolet spectrum of natural sunlight. 4,703,224, Cl. 313-487.000.

Ratzlaff, Marc H.; Frame, John M.; and Grant, Barrie D., to Washington State University Research Foundation. Electronic animal hoof force detection systems. 4,703,217, Cl. 310-338.000.
Raufast, Charles, to BP Chemicals Limited. Polymerization in several stages of alpha-olefins in the gas phase. 4,703,094, Cl. 526-65.000.
Ravichandran, Ramanathan: *See*—
Winter, Roland A. E.; Ravichandran, Ramanathan; and Seltzer, Raymond, 4,703,073, Cl. 524-99.000.
Raymont, John M., Jr., to Paul-Munroe Hydraulics, Inc. Snubbers and methods and apparatus for the in-place testing thereof. 4,702,105, Cl. 73-168.000.
Raytheon Company: *See*—
Howarth, Thomas R.; Flanagan, Peter F.; Harrold, William J.; and Rodberg, Kenneth, 4,703,464, Cl. 367-156.000.
RCA Corporation: *See*—
Balaban, Alvin R.; Harwood, Leopold A.; Patel, Chandrakant B.; and Demmer, Walter H., 4,703,340, Cl. 358-19.000.
Fletcher, James D., 4,703,396, Cl. 361-419.000.
Levine, Peter A., 4,703,442, Cl. 364-521.000.
Muterspaugh, Max W., 4,703,286, Cl. 331-117.0FE.
Ng, Sheau-Bao; and Lewis, Henry G., Jr., 4,703,357, Cl. 358-166.000.
Rodriguez-Cavazos, Enrique, 4,703,233, Cl. 315-398.000.
van der Wal, Gooitzen S., 4,703,514, Cl. 382-41.000.
White, Lawrence K.; and Brown, Richard, 4,702,993, Cl. 430-296.000.
Willis, Donald H., 4,703,341, Cl. 358-31.000.
Recipe Terminal Corporation: *See*—
Bado, Charles W.; and Detrick, Randy, 4,703,423, Cl. 364-400.000.
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Slosberg, David K.; Reece, David S.; and Claessen, Johannes A. H., 4,702,950, Cl. 428-95.000.
Rees, John R.: *See*—
Ingram, Brian; Margetts, Hugh G.; and Rees, John R., 4,702,354, Cl. 188-196.00D.
Regelman, Dale F., to Dow Chemical Company, The. Novel product and process. 4,703,099, Cl. 528-54.000.
Regie Nationale des Usines Renault: *See*—
Lombard, Claude; Brisset, Jean-Paul; Marais, Jean-Luc; and Catier, Gerard, 4,702,208, Cl. 123-339.000.
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Coulombe, David J., 4,702,551, Cl. 350-96.200.
Relihan, Gary F.: *See*—
Meccariello, Thomas V.; and Relihan, Gary F., 4,703,496, Cl. 378-99.000.
Relyea, Robert G., to Nalge Company. Plastic filter units having a weld cellulose filter. 4,702,834, Cl. 210-321.780.
Renard, Antoine: *See*—
Katz, Maurice; and Renard, Antoine, 4,702,356, Cl. 188-315.000.
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Renishaw plc: *See*—
McMurtry, David R., 4,702,013, Cl. 33-558.000.
Rensch, Walter: *See*—
Bauer, Ludwig; Schneider, Erwin; Rensch, Walter; and Weinhold, Helmut, 4,702,464, Cl. 269-55.000.
Rentz, Bruce A.: *See*—
Speet, Larry A.; and Rentz, Bruce A., 4,703,386, Cl. 361-56.000.
Research Corporation: *See*—
Bohmer, Ralph M., 4,702,598, Cl. 356-343.000.
Research Development Corporation of Japan: *See*—
Yanagawa, Motoo, 4,702,752, Cl. 55-131.000.
Research Foundation for Microbial Diseases of Osaka University, The: *See*—
Nakata, Atsuo; and Shinagawa, Hideo, 4,703,005, Cl. 435-68.000.
Research Triangle Institute: *See*—
Schindler, Anton, 4,702,917, Cl. 424-422.000.
Reule, Alfred: *See*—
Blumentritt, Martin; Reule, Alfred; and Bittner, Reinhold, 4,703,472, Cl. 370-3.000.
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Revitz, Martin: *See*—
Ahlgren, David C.; Bendernagel, Robert E.; Lange, Russell C.; and Revitz, Martin, 4,701,998, Cl. 437-31.000.
Reye, Hans: *See*—
Sundermann, Erich; Reye, Hans; and Abel, Otto, 4,703,032, Cl. 502-413.000.
Reynolds, Albert B., Jr. Undulating mixing device. 4,702,610, Cl. 366-213.000.
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Reinelt, Kalrheinz; and Schwenzer, Michael, 4,702,167, Cl. 102-282.000.
Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., 4,702,172, Cl. 102-521.000.
Rhone-Poulenc, Inc.: *See*—
Gradeff, Peter S.; and Schreiber, Fred G., 4,703,109, Cl. 534-15.000.
Rhone-Poulenc Specialites Chimiques: *See*—
Cronenberger, Michel; Lateltin, Paul; and Rustant, Robert, 4,702,835, Cl. 210-321.720.
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Rice, Hal H., to General Motors Corporation. Foundry mold for cast-to-size zinc-base alloy. 4,702,304, Cl. 164-529.000.
Richard Hirschmann Radiotechnisches Werk: *See*—
Zierhut, Hermann, 4,702,449, Cl. 248-288.300.
Richard, Matthew D., to Scott & Fetzer Company, The. Bi-directional advance gear having a torque limiting clutch. 4,702,122, Cl. 74-412.0TA.
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Zobel, Jurgen, 4,702,229, Cl. 128-4.000.
Richardson, Robert G., to Ex-Cell-O Corporation. Automatic basket bail opening machine. 4,702,061, Cl. 53-381.00R.
Richardson, Steven D., to United States of America, Navy. Explosion suppression system. 4,702,322, Cl. 169-28.000.
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Boros, Imre; Venetianer, Pal; and Posfai, Gyorgy, 4,703,012, Cl. 435-320.000.
Richter Gedeon Vegyeszeti Gyar RT: *See*—
Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.
Rickards, Rodney W.; Gill, Melvyn; and Christie, Robert M., to Australian National University, The. Process for the preparation of prostanoids. 4,703,127, Cl. 549-214.000.
Ricoh Co., Ltd.: *See*—
Culpepper, Mark A., 4,703,330, Cl. 346-75.000.
Hirano, Yasuo; and Nojima, Kazuo, 4,702,964, Cl. 428-447.000.
Mochimaru, Hideaki; Shimada, Kazuyuki; and Hirasawa, Junichi, 4,703,334, Cl. 346-160.000.
Otomura, Satoshi; and Kojima, Narihito, 4,702,979, Cl. 430-52.000.
Ricoh Systems, Inc.: *See*—
Culpepper, Mark A., 4,703,330, Cl. 346-75.000.
Rieck, Hans-Peter; Schott, Martin; and Russow, Jurgen, to Hoechst Aktiengesellschaft. Moldings made of silicate material and processes for their preparation. 4,703,029, Cl. 502-243.000.
Rieger, Johannes: *See*—
Frischmann, Albert; Rieger, Johannes; Mermi, Kurt; Kistner, Herbert; and Zimmermann, E. Harald, 4,702,654, Cl. 411-31.000.
Ringsdorf, Helmut: *See*—
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.
Rinkovsky, Robert C., Sr. Composite plant holders and method of making them. 4,702,390, Cl. 220-453.000.
Risdon Corporation: *See*—
Seager, Richard H., 4,702,398, Cl. 222-386.000.
Riumbau, Conrad: *See*—
Colodner, Jesse L.; and Riumbau, Conrad, 4,703,165, Cl. 235-487.000.
Riv-Skf Officine Di Villar Perosa S.p.A.: *See*—
Pollastro, Giovanni, 4,702,627, Cl. 384-526.000.
Rivasson, Yves: *See*—
Miller, Gilles; and Rivasson, Yves, 4,702,806, Cl. 204-106.000.
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Robak, Casimir B., Jr.: *See*—
Peinecke, Dale R.; Robak, Casimir B., Jr.; and Dubs, Robert A., 4,702,324, Cl. 173-39.000.
Robatel Slpi: *See*—
Davier, Jean-Pierre, 4,702,625, Cl. 384-428.000.
Robb, Paul N.: *See*—
Mercado, Romeo I.; and Robb, Paul N., 4,702,569, Cl. 350-479.000.
Robert Bosch GmbH: *See*—
Bohringer, Wilfried; and Eheim, Franz J., deceased, 4,702,680, Cl. 417-490.000.
Hogh, Josef; and Schacht, Hans, 4,702,790, Cl. 156-293.000.
Kehl, Georg; and Schafer, Ernst-Dieter, 4,701,990, Cl. 29-441.00R.
Palesch, Reinhard, 4,703,258, Cl. 324-73.00R.
Roberts, Bruce E.: *See*—
Black, Jimmy C.; and Roberts, Bruce E., 4,702,967, Cl. 428-620.000.
Roberts, Janet S.: *See*—
LoJacono, Francis X.; and Roberts, Janet S., 4,702,448, Cl. 248-231.700.
Roberts, Roy D., to ILC Technology, Inc. Method for assembling arc lamp. 4,702,716, Cl. 445-26.000.
Robertson, Brian T., to General Electric Company. Microstrip line and method for fabrication. 4,703,392, Cl. 361-402.000.
Robertson, John W., Jr.: *See*—
Fry, John J.; Bastijanic, Edward; and Robertson, John W., Jr., 4,703,407, Cl. 363-16.000.
Robinson, Earl F.; and Bare, Rex O., to Andover Medical Incorporated. Electrical connector for a disposable electrode. 4,702,256, Cl. 128-639.000.

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Rendulic, Francis J.; Robinson, Randolph H.; and Maccini, John A., 4,702,994, Cl. 430-306.000.

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Stern, Howard; and Mauro, Alex, 4,702,605, Cl. 356-375.000.

Rockwell International Corporation: *See—*
Depa, Louis S., 4,702,166, Cl. 101-415.100.
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Howarth, Thomas R.; Flanagan, Peter F.; Harrold, William J.; and Rodberg, Kenneth, 4,703,464, Cl. 367-156.000.

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Roe, Douglas A. Atomizing valve apparatus for internal combustion engine. 4,702,220, Cl. 123-593.000.

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Westfall, Alan P.; and Roe, Robert J., 4,702,676, Cl. 417-87.000.

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Bishop, Arthur E.; and Roeske, Klaus J., 4,703,145, Cl. 219-69.00R.

Roggendorf, Peter, to GSE Electronic Systems, Inc. Method and apparatus for transferring an information code onto the synchronization track of a video tape and a video tape produced according to said method. 4,703,311, Cl. 340-347.0DD.

Rohde, Axel: *See—*
Schilling, Albert; Schuttler, Edwin; Schmekel, Karl-Wilhelm; and Rohde, Axel, 4,702,565, Cl. 350-531.000.

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Rohm, Gunter H. Percussion drill and chuck arrangement therefor. 4,702,485, Cl. 279-19.400.

Rohrman, Albert C., Jr.: *See—*
Kokotailo, George T.; and Rohrman, Albert C., Jr., 4,703,025, Cl. 502-60.000.

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Rokon International, Inc.: *See—*
Hamilton, Mark, 4,702,340, Cl. 180-224.000.

Rolfe, Robert M.; and Falkenstrom, Lee J., to Harris Corporation. Programmable integrated circuit fault detection apparatus. 4,703,484, Cl. 371-25.000.

Rolls-Royce: *See—*
Winter, John L., 4,702,670, Cl. 415-116.000.

Rolls-Royce plc: *See—*
Cureton, John E.; and Lyons, Michael R., 4,702,070, Cl. 60-39.070.
Jenkins, John E.; Sperinck, John; and Buller, Michael J., 4,702,071, Cl. 60-39.092.

Rolscreen Company: *See—*
Van Klompenburg, Marlo, 4,702,297, Cl. 160-271.000.

Romac Industries Inc.: *See—*
Kent, Randy K., 4,702,886, Cl. 420-18.000.

Rooklyn, Jack, to Industrial Management Co. Product having grounded static-free work surface. 4,702,951, Cl. 428-193.000.

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Huang, Fu-chih; Suh, John T.; and Skiles, Jerry W., 4,703,037, Cl. 514-19.000.

Rosman, Alan H., to Dynamic Hydraulic Systems, Inc. Hydraulically operated clam-shell device. 4,702,076, Cl. 60-372.000.

Ross, Iain E., to Ferranti, plc. Waveguide laser. 4,703,489, Cl. 372-64.000.

Rossetti, Anthony J.; and Nysen, Paul A., to X-Cyte, Inc. Interrogator/receiver system for use with a remote transponder. 4,703,327, Cl. 342-44.000.

Rotex, Inc.: *See—*
Pogue, Glenn J., 4,702,826, Cl. 209-237.000.

Rottmaier, Ludwig: *See—*
Jonas, Friedrich; Muller, Richard; Merten, Rudolf; and Rottmaier, Ludwig, 4,702,953, Cl. 428-209.000.

Roussel Uclaf: *See—*
Gillespie, Roger J.; and Tully, Wilfred R., 4,703,049, Cl. 514-258.000.
Marty, Jean-Pierre, 4,702,913, Cl. 424-95.000.
Nedelec, Lucien, 4,703,050, Cl. 514-277.000.

Rowland, Roy C.: *See—*
Janssen, Gwen V.; and Rowland, Roy C., 4,702,345, Cl. 181-129.000.

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Rozmus, Walter J., to Kelsey Hayes Co. Drum brake adjuster. 4,702,357, Cl. 188-79.5GC.

Rubloff, Gary W.: *See—*
Beha, Johannes G.; Dreyfus, Russell W.; Kash, Jeffrey A.; and Rubloft, Gary W., 4,703,260, Cl. 324-158.00R.

Ruetz, Georg: *See—*
Leicht, Werner; Ruetz, Georg; and Giesselmann, Juergen, 4,702,672, Cl. 415-164.000.

Ruhnau, Gerhard, to WABCO Westinghouse Fahrzeugbremsen GmbH. Overvoltage protection circuit arrangement for vehicular antiskid brake control systems. 4,703,388, Cl. 361-91.000.

Ruiz, Orlando: *See—*
Fossas, Arturo; and Ruiz, Orlando, 4,703,499, Cl. 379-194.000.

Rumbolt, Robin B.; McIntyre, William R.; and Goodson, Larry E., to NAP Consumer Electronics Corp. Universal remote control unit with model identification capability. 4,703,359, Cl. 358-194.100.

Rung, Robert: *See—*
deRaymond, Peter G.; and Rung, Robert, 4,702,499, Cl. 285-112.000.

Ruskin, Rodney; and Sacks, Rael, to Agrifim Irrigation International NV. Process for making drip irrigation lines. 4,702,787, Cl. 156-244.250.

Russell, John L., Jr.; and Coggins, David N., to Theragenics Corporation. X-ray-emitting interstitial implants. 4,702,228, Cl. 128-1.200.

Russow, Jurgen: *See—*
Rieck, Hans-Peter; Schott, Martin; and Russow, Jurgen, 4,703,029, Cl. 502-243.000.

Rustant, Robert: *See—*
Cronenberger, Michel; Lateltin, Paul; and Rustant, Robert, 4,702,835, Cl. 210-321.720.

Ryan, Adrian J.: *See—*
Wruck, Paul D.; and Ryan, Adrian J., 4,702,421, Cl. 241-15.000.

Ryan, Douglas G.; and Ackerman, Steven, to Exxon Research and Engineering Company. Removing haze from hydrocarbon oil mixture boiling in the lubricating oil range. 4,702,817, Cl. 208-28.000.

Ryan, Hillary A. Veterinary-sauce prophylactic. 4,702,914, Cl. 424-195.100.

Ryer, Jack: *See—*
Gutierrez, Antonio; Brois, Stanley J.; Ryer, Jack; and Deen, Harold E., 4,702,850, Cl. 252-48.200.

Rylatt, John A.: *See—*
Klug, Ralph W.; Toler, Charles E.; and Rylatt, John A., 4,702,878, Cl. 376-249.000.

Ryobi Ltd.: *See—*
Ishii, Koji, 4,702,470, Cl. 271-229.000.

Ryynanen, Seppo I., to Nobar Ky. Method of and apparatus for sequentially separating a medium into different components. 4,702,846, Cl. 210-788.000.

S. C. Johnson & Son, Inc.: *See—*
Suhajda, John I., 4,703,155, Cl. 219-271.000.

Sacks, Martin B., to Sun Metal Products, Inc. Resin-augmentation of pin-assembly for extruded, anodized wheel rims. 4,702,528, Cl. 301-99.000.

Sacks, Rael: *See—*
Ruskin, Rodney; and Sacks, Rael, 4,702,787, Cl. 156-244.250.

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Safetran Systems Corporation: *See—*
Snee, Ronald W., 4,703,303, Cl. 340-47.000.

Sagami, Yosuke; Yamamoto, Akira; Watanabe, Shoji; Isobe, Tomohisa; and Funato, Susumu, to Daicel Chemical Industries, Ltd. Resin composition to seal electronic device. 4,703,338, Cl. 357-72.000.

Saijo, Hideo: *See—*
Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige; and Saijo, Hideo, 4,702,872, Cl. 264-114.000.

St-Arnaud, Jean-Marie: *See—*
Achtermann, Jurgen H.; Bose, Tapan K.; and St-Arnaud, Jean-Marie, 4,702,604, Cl. 356-361.000.

Saito, Fuminari: *See—*
Nakayama, Nobuo; Nagamine, Kenzi; Ueda, Kazuya; and Saito, Fuminari, 4,703,186, Cl. 250-566.000.

Saito, Hitoshi: *See—*
Ushimaru, Koichi; Nakamichi, Koichi; and Saito, Hitoshi, 4,702,918, Cl. 424-461.000.

Saito, Keishi: *See—*
Ishihara, Shunichi; Saito, Keishi; Oda, Shunri; and Shimizu, Isamu, 4,702,934, Cl. 427-39.000.

Saito, Masaji, to Daiwa Seiko Co, Ltd. Adjustable force drag brake device for a fishing reel. 4,702,430, Cl. 242-84.50A.

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Matsuzaki, Atsushi; and Saito, Mitsumasa, 4,703,345, Cl. 358-74.000.

Saito Motors CC., Ltd.: *See—*
Saito, Shosaku, 4,701,972, Cl. 15-250.220.

Saito, Shosaku, to Saito Motors CC., Ltd. Rotary window cleaner. 4,701,972, Cl. 15-250.220.

Saito, Taiji; and Kotani, Akira, to Toyota Kidosha Kabushiki Kaisha. Air-cooled type intercooler for a supercharged internal combustion engine. 4,702,079, Cl. 60-599.000.

Saito, Takashi; Nitanda, Hiroshi; Inuzuka, Tsuneki; Tokuhara, Mitsuhiro; and Honda, Haruhisa, to Canon Kabushiki Kaisha. Copy board apparatus. 4,702,586, Cl. 355-3.00R.

Saito, Yoshiaki: *See—*
Shimozawa, Toru; Nishimatsu, Masaharu; and Saito, Yoshiaki, 4,702,959, Cl. 428-323.000.

Saitoh, Shigeru: *See—*
Narue, Atsushi; Saitoh, Shigeru; and Maruyama, Tomoyuki, 4,702,722, Cl. 464-93.000.

Saka, Kazuhiko; Hisano, Atsushi; Kato, Michitaka; Masaki, Toshimichi; and Nakatsuka, Nobuo, to Omron Tateisi Electronics Co. Pattern outline tracking method and apparatus. 4,703,512, Cl. 382-22.000.

Saka, Kazuhiko: *See—*
Hisano, Atushi; Yamaguchi, Yoshinori; Masaki, Toshimichi; Saka, Kazuhiko; Nakatsuka, Nobuo; and Kato, Mitsutaka, 4,703,344, Cl. 358-60.000.

Sakai, Osamu: *See—*
Shinoda, Takashi; and Sakai, Osamu, 4,703,453, Cl. 365-104.000.

Sakamoto, Atsushi; and Iwahara, Makoto, to Victor Company of Japan, Ltd. Directional microphone apparatus. 4,703,506, Cl. 381-92.000.
Sakamoto, Kazuho, to Matsushita Electric Industrial Co., Ltd. Heating cooking appliance having weight detecting function. 4,703,151, Cl. 219-518.000.
Sakamoto, Keiji; and Kobayashi, Toshio, to Fanuc Ltd. Method and apparatus for controlling permanent magnet synchronous motor by using pulse width modulation. 4,703,245, Cl. 318-809.000.
Sakamoto, Keiji; and Kobayashi, Toshio, to Fanuc Ltd. Control method and apparatus for synchronous motor. 4,703,246, Cl. 318-809.000.
Sakamoto, Masahide: *See*—
Amano, Matsuo; Shida, Masami; Sakamoto, Masahide; Hirayama, Takeshi; and Sasayama, Takao, 4,703,430, Cl. 364-431.050.
Sakashita, Kiichiro: *See*—
Imai, Eiichi; Sakashita, Kiichiro; Takagi, Seiichi; and Kukimoto, Tsutomo, 4,702,986, Cl. 430-120.000.
Sakata, Masao, to Nissan Motor Company, Limited. System and method for controlling a vehicle speed of an automotive vehicle. 4,703,429, Cl. 364-426.000.
Sakauchi, Takashi; Mohri, Fumihiko; Tomoda, Naohisa; and Nakatsuka, Satoshi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Multipolarly magnetized magnet. 4,702,852, Cl. 252-62.540.
Sako, Shizuka; Amaike, Kanetoshi; and Watanabe, Youji, to Chuba Seiko Co., Ltd. Sliver drawing apparatus. 4,703,431, Cl. 364-470.000.
Sako, Yoshitaka: *See*—
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, 4,703,106, Cl. 530-307.000.
Sakuma, Toshiyuki: *See*—
Endo, Shyusuke; Aoyama, Naofumi; Yabuuchi, Toshihiko; Sakuma, Toshiyuki; and Kinugawa, Kiyoshige, 4,702,560, Cl. 350-333.000.
Sakurai, Kenji: *See*—
Maeda, Yoshihiko; Nogami, Toshiaki; Kashiwagi, Shigeru; Sakurai, Kenji; and Nishiyama, Kunio, 4,702,517, Cl. 296-214.000.
Salazar, Don, Jr.; and Spector, George. Eyeglasses holder. 4,702,451, Cl. 248-309.100.
Salford Electrical Instruments, Limited: *See*—
Jones, David W.; and Elston, Malcolm, 4,703,328, Cl. 343-704.000.
Salice, Luciano, to Arturo Salice, S.p.A. Furniture hinge. 4,701,979, Cl. 16-346.000.
Salk Institute for Biological Studies, The: *See*—
Rivier, Jean E. F.; Spiess, Joachim; and Vale, Wylie W., Jr., 4,703,035, Cl. 514-12.000.
Salmi, Pekka; and Muuttonen, Timo, to Oy Tampella AB. Coupling arrangement for a drill shank of a percussion drilling machine. 4,702,326, Cl. 173-104.000.
Salmi, Pekka: *See*—
Heideman, Torsten; Levander, Kai; and Salmi, Pekka, 4,702,187, Cl. 114-40.000.
Salour, Michael M.; Schoner, Gerhard; Bechtel, James H.; and Kull, Martin, to Tacan Corporation. Fiber-optic sensor with two different wavelengths of light traveling together through the sensor head. 4,703,175, Cl. 250-227.000.
Salter, Larry, to Briles, Paul R. Apparatus for reducing installation forces and costs in a tapered bolt installation. 4,702,658, Cl. 411-426.000.
Sampson, Robert; and Flanigan, Sean, to Wasco Products, Inc. Skylight sealing. 4,702,049, Cl. 52-200.000.
Samuels, Howard. Isolation amplifier with T-type modulator. 4,703,283, Cl. 330-9.000.
Sanders Associates, Inc.: *See*—
Woodsum, Harvey C., 4,703,462, Cl. 367-92.000.
Sanderson, John R.: *See*—
Marquis, Edward T.; Sanderson, John R.; and Keating, Kenneth P., 4,703,027, Cl. 502-171.000.
Sandoz Ltd.: *See*—
Seebach, Dieter, 4,703,033, Cl. 514-11.000.
Sandwick, Thomas K. Collet chuck with internal and external work stops. 4,702,484, Cl. 279-1.00S.
Sankey, Ivor G., to Hardy Spicer Limited. Hub assembly. 4,702,526, Cl. 301-6.0WB.
Sano, Yasukazu, to Fuji Electric Company, Ltd. Optical fiber frequency filter and multiplexer using same. 4,702,550, Cl. 350-96.160.
Sano, Yosiaki, to Nihon Plast Co., Ltd. Ventilator grill and method for assembling the same. 4,702,156, Cl. 98-40.240.
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Nakase, Ryoichi, 4,702,714, Cl. 440-61.000.
Santa Fe International Corporation: *See*—
Morris, Gordon A., 4,702,646, Cl. 405-169.000.
Santal Equipmentos S.A.: *See*—
Cerveira de Mello Ribeiro Pinto, Luiz A., 4,702,423, Cl. 241-60.000.
Santilli, Michael A. Cover plate plug retainer. 4,702,709, Cl. 439-144.000.
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Morioka, Toru, 4,703,247, Cl. 320-13.000.
Nomura, Shigeo; and Nakanishi, Syoji, 4,702,007, Cl. 30-423.000.
Sanyo Fine Co., Ltd.: *See*—
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, 4,703,106, Cl. 530-307.000.
Saperstein, Richard: *See*—
Freidinger, Roger; Nutt, Ruth F.; Lyle, Terry A.; and Saperstein, Richard, 4,703,034, Cl. 514-11.000.
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Sasamoto, Toshio: *See*—
Iguma, Akira; Okuda, Tadashi; Ieki, Kouichi; and Sasamoto, Toshio, 4,702,555, Cl. 350-247.000.
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Amano, Matsuo; Shida, Masami; Sakamoto, Masahide; Hirayama, Takeshi; and Sasayama, Takao, 4,703,430, Cl. 364-431.050.
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Manservisi, Renato; and Fossi, Mario, 4,702,730, Cl. 493-56.000.
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Sato, Jiro: *See*—
Ai, Hideo; Ideda, Akihiko; and Sato, Jiro, 4,702,997, Cl. 430-325.000.
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Nakajima, Masayuki; Sato, Shinichi; Tokui, Akira; Kawai, Akira; Nagatomo, Masao; and Ozaki, Hiroji, 4,702,796, Cl. 156-653.000.
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Kinoshita, Toshiyuki; Arai, Toshiaki; Sato, Takao; Kubo, Takashige; Yoshizawa, Yasufumi; and Mori, Hiromichi, 4,703,422, Cl. 364-200.000.
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Yamada, Yasuyuki; Sato, Yasuhisa; Nakayama, Hiroki; and Oizumi, Kouji, 4,702,581, Cl. 354-126.000.
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Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, 4,702,977, Cl. 429-194.000.
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Birk, Adalbert; and Saugeon, Ulrich, 4,703,440, Cl. 364-521.000.
Sausner, Andreas; and Volz, Peter, to VDO Adolf Schindling AG. Device for adjusting the idling rpm. 4,702,209, Cl. 123-339.000.
Savov, Peter H.: *See*—
Bakalov, Nikolay G.; Penev, Penyo I.; Ivanov, Ivan K.; Velev, Velyo T.; Savov, Peter H.; and Vulchev, Alexander Y., 4,703,493, Cl. 373-95.000.
Sawada, Daisaku: *See*—
Kouno, Katsumi; and Sawada, Daisaku, 4,702,725, Cl. 474-28.000.
Sawada, Kazuo, to Sumitomo Electric Industries Ltd. Method of making thin alloy wire. 4,702,302, Cl. 164-463.000.
Schacht, Hans: *See*—
Hogh, Josef; and Schacht, Hans, 4,702,790, Cl. 156-293.000.
Schafer, Cyril L. Toilet stool instant odor removal means. 4,701,966, Cl. 4-213.000.
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Kehl, Georg; and Schafer, Ernst-Dieter, 4,701,990, Cl. 29-441.00R.
Scheffer, Louis G., Sr. Method for making channel letters for signs. 4,701,991, Cl. 29-450.000.
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Schenkl, Joseph L. Orthopedic apparatus. 4,702,255, Cl. 128-586.000.
Scheuble, Bernhard; Eidenschink, Rudolf; and Weber, Georg, to Merck Patent Gesellschaft mit beschrankter Haftung. Liquid crystal phase. 4,702,562, Cl. 350-350.00R.
Schewe, Herbert; and Diepers, Heinrich, to Siemens Aktiengesellschaft. Thin-film magnetic head for perpendicular (vertical) recording. 4,703,382, Cl. 360-125.000.
Schiffert, Phillip W., to Magnaflux Corporation. Method for nondestructive testing of a magnetizable workpiece under cold weather conditions using a magnetic particle bath. 4,703,263, Cl. 324-216.000.
Schildmann, Jens A.: *See*—
Wiesenberger, Alfred; Schildmann, Jens A.; Kolb, Erich; and Dechent, Hans-Mario, 4,702,922, Cl. 426-51.000.
Schilling, Albert; Schuttler, Edwin; Schmekel, Karl-Wilhelm; and Rohde, Axel, to Carl-Zeiss-Stiftung. Cross-slide stage for a microscope. 4,702,565, Cl. 350-531.000.
Schindler, Anton, to Research Triangle Institute. Porous bioabsorbable polyesters. 4,702,917, Cl. 424-422.000.
Schine, Jonathan M., to High Resolution Sciences, Inc. Select switch box for white on black and black on white CRT data display. 4,703,319, Cl. 340-723.000.
Schips, Helmut: *See*—
Muller, Ernst, 4,703,432, Cl. 364-470.000.
Schirbach, Arno: *See*—
Naoumidis, Aristides; Neumeister, Herbert; Schirbach, Arno; Struck, Bernd D.; and Triefenbach, Dieter, 4,702,784, Cl. 156-89.000.
Schlafer, Ludwig: *See*—
Mischke, Peter; and Schlafer, Ludwig, 4,703,112, Cl. 534-642.000.

Schleicher, John K., to Accuratio Systems, Inc. Power transmission device. 4,702,124, Cl. 74-675.000.
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Schlingmann, Merten: *See*—
Fischer, Edgar; and Schlingmann, Merten, 4,703,117, Cl. 536-114.000.
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Catala, Gerard; Stowe, Ian; and Henry, Daniel, 4,703,427, Cl. 364-422.000.
Kenyon, William E.; Baker, Paul L.; Sen, Pabitra N.; and Banavar, Jayanth R., 4,703,277, Cl. 324-323.000.
Kurkjian, Andrew L.; Chang, Shu-Kong; and Everhart, Ann H., 4,703,460, Cl. 367-31.000.
Schluter, Peter: *See*—
Briggs, Stuart J.; Parker, David J.; and Schluter, Peter, 4,702,078, Cl. 60-585.000.
Schmekel, Karl-Wilhelm: *See*—
Schilling, Albert; Schuttler, Edwin; Schmekel, Karl-Wilhelm; and Rohde, Axel, 4,702,565, Cl. 350-531.000.
Schmidt, Gunther, to Parker Pen Company, The. Multicolor writing implement. 4,702,633, Cl. 401-34.000.
Schmidt, Hans-Werner: *See*—
Etzbach, Karl-Heinz; Neumann, Peter; Dust, Matthias; Ringsdorf, Helmut; Schmidt, Hans-Werner; Baur, Guenter; Windscheid, Friedrich; and Kiefer, Rudolf, 4,702,945, Cl. 428-1.000.
Schmidt, Harald H.; and McDowall, Rory, to Mold-Masters Limited. Side mounted manifold block for variable orientation of injection molding nozzle. 4,702,689, Cl. 425-548.000.
Schmit, Louis: *See*—
Ulveling, Leon; Schmit, Louis; and Legille, Edouard, 4,702,288, Cl. 141-67.000.
Schmitz, Charles E., to Grumman Aerospace Corporation. Infrared focal plane module. 4,703,170, Cl. 250-211.00R.
Schneider, Erwin: *See*—
Bauer, Ludwig; Schneider, Erwin; Rensch, Walter; and Weinhold, Helmut, 4,702,464, Cl. 269-55.000.
Scholl, Herbert; and Brockmuller, Uwe, to SKF GmbH. Sealing rolling bearing. 4,702,626, Cl. 384-477.000.
Schoner, Gerhard: *See*—
Salour, Michael M.; Schoner, Gerhard; Bechtel, James H.; and Kull, Martin, 4,703,175, Cl. 250-227.000.
Schott, Martin: *See*—
Rieck, Hans-Peter; Schott, Martin; and Russow, Jurgen, 4,703,029, Cl. 502-243.000.
Schrader, Jennifer R.; and Geisen, Harry. Harness for restraining a child. 4,702,523, Cl. 297-485.000.
Schrader, Karlheinz: *See*—
Weber, Gephard; and Schrader, Karlheinz, 4,703,041, Cl. 514-23.000.
Schreiber, Fred G.: *See*—
Gradeff, Peter S.; and Schreiber, Fred G., 4,703,109, Cl. 534-15.000.
Schreiber, Paris H. S. Revolver with firing order indicator notches. 4,702,030, Cl. 42-1.020.
Schreiner, Philip A.: *See*—
Bretzka, Ellen E.; Quan, Zoe S.; and Schreiner, Philip A., 4,703,475, Cl. 370-60.000.
Schroder, Eckhard; and Thyzel, Reinhardt, to Meditec-Reinhardt Thyzel GmbH. Pulsed laser for medical applications. 4,702,245, Cl. 128-303.100.
Schroder, Gunter: *See*—
Mischke, Joachim; and Schroder, Gunter, 4,702,663, Cl. 414-618.000.
Schroder, Werner, to LITEF GmbH. Method and apparatus for measuring rate of rotation by the sagnac effect. 4,702,601, Cl. 356-350.000.
Schroder, Werner: *See*—
Handrich, Eberhard; and Schroder, Werner, 4,702,600, Cl. 356-350.000.
Schukar, Gary W.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.
Schuler, Fredrick E., to Donaldson Company, Inc. By-pass valve. 4,702,269, Cl. 137-246.120.
Schulz, Terry L.: *See*—
Tower, Stephen N.; and Schulz, Terry L., 4,702,879, Cl. 376-282.000.
Schuttler, Edwin: *See*—
Schilling, Albert; Schuttler, Edwin; Schmekel, Karl-Wilhelm; and Rohde, Axel, 4,702,565, Cl. 350-531.000.
Schwable, Rainer: *See*—
Hassenpflug, Wolfgang; and Schwable, Rainer, 4,702,106, Cl. 73-181.000.
Schwarzkopf, Werner: *See*—
Koester, Rainer; Smailos, Emanuel; Schwarzkopf, Werner; and Kiesow, Arthur, 4,702,391, Cl. 220-456.000.
Schwendemann, Kenneth L.: *See*—
Gano, John C.; Schwendemann, Kenneth L.; Noack, Timothy J.; and Godfrey, Craig W., 4,702,320, Cl. 166-343.000.
Schwenzer, Michael: *See*—
Reinelt, Kalrheinz; and Schwenzer, Michael, 4,702,167, Cl. 102-282.000.
Sclavo, S.p.A.: *See*—
Tabacco, Alessandro; Moda, Edoardo; and Tarli, Paolo, 4,703,015, Cl. 436-74.000.
Scott Badar Co., Ltd.: *See*—
Phillips, Cecil L., 4,702,057, Cl. 52-514.000.
Scott & Fetzer Company, The: *See*—
Richard, Matthew D., 4,702,122, Cl. 74-412.0TA.
Scott, Graham A., to General Electric Company. Static trip circuit breaker with automatic circuit trimming. 4,703,389, Cl. 361-93.000.
Scott, Robert T. Earplug. 4,702,238, Cl. 128-151.000.
Scudder, Glenn N.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.
Seager, Richard H., to Risdon Corporation. Product dispenser with advance/retract-type delivery means. 4,702,398, Cl. 222-386.000.
Seal, Jack M. Calf trim chute. 4,702,199, Cl. 119-99.000.
Seasholtz, Craig A.: *See*—
Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., 4,701,969, Cl. 15-79.00R.
Seebach, Dieter, to Sandoz Ltd. Novel cyclosporins. 4,703,033, Cl. 514-11.000.
Seeger-Orbis GmbH: *See*—
Malm, Rune; and Mihalcea, Radu, 4,702,001, Cl. 29-720.000.
Seel, David D.: *See*—
Wilson, John F.; Seel, David D.; and Pepka, James M., 4,702,883, Cl. 376-446.000.
Seel, Klaus: *See*—
Rasshofer, Werner; Paul, Reiner; Seel, Klaus; and Weber, Christian, 4,703,100, Cl. 528-66.000.
Segal, Marcos; and Kunze, Michael. Water-soluble compounds containing one or two (nitrophenylamino)-phenylamino-chlorotriazinylamino groups, the nitrophenylamino being additionally substituted by a fiber-reactive group of the vinylsulfonyl series, suitable as dyestuffs. 4,703,111, Cl. 534-637.000.
Seibert, Wolfram; and Blum, Klaus-Dieter, to Alfred Teves GmbH. Method and brake system for traction control. 4,702,336, Cl. 180-197.000.
Seibert, Wolfram: *See*—
Belart, Juan; Burgdorf, Jochen; and Seibert, Wolfram, 4,702,530, Cl. 303-10.000.
Seifert, Josef, to Kurz Kunstoffe GmbH. Method and device for storing flat recording media. 4,702,533, Cl. 312-12.000.
Seiko Instruments & Electronics Ltd.: *See*—
Ohtawa, Shuzi, 4,702,613, Cl. 368-66.000.
Seikosha Co., Ltd.: *See*—
Kizawa, Hiroyuki, 4,702,616, Cl. 368-223.000.
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, 4,702,579, Cl. 354-21.000.
Seiler, Norman C.; and Walker, Stephen S., to Harris Corporation. Speech data encoding scheme. 4,703,505, Cl. 381-51.000.
Sejimo, Akinobu; and Ono, Shigeo, to Kabushiki Kaisha Meiji Gomu Kasei. Method for continuously vulcanizing hoses. 4,702,867, Cl. 264-25.000.
Seki, Masaki: *See*—
Kishi, Hajimu; Seki, Masaki; Takegahara, Takashi; and Onishi, Yasushi, 4,703,415, Cl. 364-170.000.
Seki, Yoichi: *See*—
Ogihara, Masuo; Oda, Hajime; Seki, Yoichi; and Yamazaki, Hiroshi, 4,702,579, Cl. 354-21.000.
Sekiguchi, Yoshishige; and Kubota, Tomiyasu, to Showa Denko Kabushiki Kaisha. Joined carbon electrodes and method for the joining thereof. 4,703,492, Cl. 373-91.000.
Sekine, Mikiya: *See*—
Matsushita, Toshihiko; Morishita, Sadao; and Sekine, Mikiya, 4,703,335, Cl. 503-204.000.
Selmer, Jacques: *See*—
Selmer, Jean, 4,701,978, Cl. 16-380.000.
Selmer, Jean, to Selmer, Jacques. Hinge pin guide, especially for musical instruments. 4,701,978, Cl. 16-380.000.
Seltzer, Raymond: *See*—
Winter, Roland A. E.; Ravichandran, Ramanathan; and Seltzer, Raymond, 4,703,073, Cl. 524-99.000.
Selvaggi, Jerry A.; and Purcell, John R., to Eriez Manufacturing Company. Superconductor high gradient magnetic separator. 4,702,825, Cl. 209-224.000.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei, 4,703,337, Cl. 357-30.000.
Sen, Pabitra N.: *See*—
Kenyon, William E.; Baker, Paul L.; Sen, Pabitra N.; and Banavar, Jayanth R., 4,703,277, Cl. 324-323.000.
Senft, Stephen P.: *See*—
Morris, Merle E.; and Senft, Stephen P., 4,702,717, Cl. 445-27.000.
Sengbusch, Gunter V., to Akzo NV. Method of and arrangement for extracorporal removal of toxins from blood. 4,702,841, Cl. 210-638.000.
Senko Medical Instrument Mfg. Co. Ltd.: *See*—
Phuc, Tran N., 4,702,678, Cl. 417-360.000.
Settanni, Richard: *See*—
Kahl, William; and Settanni, Richard, 4,703,171, Cl. 250-221.000.
Setterholm, Vance C.; and Hunt, John F., to United States of America, Agriculture. Method and apparatus for forming three dimensional structural components from wood fiber. 4,702,870, Cl. 264-87.000.
Severson, Ervin L.: *See*—
Graber, Joseph V.; and Severson, Ervin L., 4,702,401, Cl. 224-42.03B.

SGS Microelettronica S.p.A.: *See*—
De La Plaza, Alejandro; and Torelli, Guido, 4,703,249, Cl. 323-316.000.
Shade, James W.; and Higgs, Robert J., to Contech Construction Products Inc. Gasket for making joints in corrugated plastic pipe. 4,702,502, Cl. 285-231.000.
Shaine, William L., to SPM Manufacturing Corporation. Method of making pages for photo albums and pages thereby formed. 4,702,026, Cl. 40-159.000.
Shaken Co., Ltd.: *See*—
Fukuda, Shinichiro, 4,703,516, Cl. 382-56.000.
Shalek, Peter D., to United States of America, Energy. Process for growing silicon carbide whiskers by undercooling. 4,702,901, Cl. 423-346.000.
Shao, Shih-Chin, to Holmes Products Corp. Tiltable and adjustably oscillatable portable electric heater/fan. 4,703,152, Cl. 219-370.000.
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., to M. W. Kellogg Company, The. Process for separation of hydrocarbon mixtures. 4,702,819, Cl. 208-354.000.
Sharp Kabushiki Kaisha: *See*—
Kadono, Masaru; Nago, Kumio; Yamamoto, Tatsushi; Muramatsu, Tersuro; Tsuchimoto, Shuuhei; Yoshikawa, Mitsuhiko; and Tomita, Masatoshi, 4,702,935, Cl. 427-42.000.
Kita, Ryusuke; Nishigaki, Satoshi; and Tsuchimoto, Shuhei, 4,701,997, Cl. 437-5.000.
Nakamura, Tsuneo; Yamasaki, Hidenori; Kira, Tohru; and Yoshikawa, Mitsuhiko, 4,702,794, Cl. 156-643.000.
Shiomi, Masuo; and Aramaki, Takashi, 4,703,317, Cl. 340-723.000.
Sharrit, David D., to Hewlett-Packard Company. Vector network analyzer with integral processor. 4,703,433, Cl. 364-485.000.
Shaw, Byron, to Blue Water Research, Inc. Downrigger cable accessory. 4,702,033, Cl. 43-43.120.
Shaw, Henri, to N.V. Weefautomaten Picanol. Process and apparatus for inspecting woven fabric during its production on one or more looms. 4,702,283, Cl. 139-348.000.
Shay, Gregory D.; Devona, James E.; and Kail, James E., to DeSoto, Inc. Aqueous latices having improved coating rheology. 4,703,080, Cl. 524-555.000.
Sheehan, Joseph C. M., to Kells Medical, Incorporated. Wound closure device. 4,702,251, Cl. 128-335.000.
Shell Oil Company: *See*—
Esparza, Joe O., 4,702,647, Cl. 405-169.000.
Shell Western E&P Inc.: *See*—
Geer, Julia S., 4,702,758, Cl. 62-532.000.
Shelley, Delwyn J. Hot water tank water preheater. 4,702,226, Cl. 126-362.000.
Shen, Chin W., to Texaco Inc. Steam foam floods with a caustic agent. 4,702,317, Cl. 166-272.000.
Shepherd, Fred A.: *See*—
Whiteley, John; and Shepherd, Fred A., 4,702,068, Cl. 57-401.000.
Sheppard, John D.: *See*—
Mulholland, D. Lindsay; and Sheppard, John D., 4,703,007, Cl. 435-161.000.
Sherbeck, Terry G., to Tektronix, Inc. Touch panel input apparatus. 4,703,316, Cl. 340-706.000.
Sheridan, Stephen E.: *See*—
Hensel, Robert J.; Wagner, James L.; Hundertmark, James M.; Sheridan, Stephen E.; and Heidel, David W., 4,702,202, Cl. 123-52.00M.
Sherman, William, III; Larkin, Francis C.; and Horvath, Stephen J., to Brandt, Incorporated. Method and apparatus for counting sheets which may be fed in skewed and/or overlapping fashion. 4,703,172, Cl. 250-223.00R.
Sherwood Medical Company: *See*—
Cornell, William D.; Gilson, Richard W.; Burkholder, Richard A.; and Ausherman, Ronald W., 4,702,261, Cl. 128-754.000.
Shevlin, Craig M.: *See*—
Phillips, Roger W.; Shevlin, Craig M.; and Matteucci, John S., 4,702,963, Cl. 428-426.000.
Shfaram, Adiel: *See*—
Zakai, Avraham; and Shfaram, Adiel, 4,702,280, Cl. 137-853.000.
Shiba, Toyoaki; Goto, Seiichi; and Ito, Keishi, to Toyo Construction Co., Ltd. Helical dredge cutter head with scoop-in plates. 4,702,024, Cl. 37-67.000.
Shibata, Makiko: *See*—
Hirose, Sachio; Homma, Tammotsu; Kurihara, Takashi; Adachi, Hidenari; Sako, Yoshitaka; and Shibata, Makiko, 4,703,106, Cl. 530-307.000.
Shibata, Norio, to Victor Company of Japan, Limited. Magnetic head with a film coil. 4,703,381, Cl. 360-123.000.
Shida, Masami: *See*—
Amano, Matsuo; Shida, Masami; Sakamoto, Masahide; Hirayama, Takeshi; and Sasayama, Takao, 4,703,430, Cl. 364-431.050.
Shigeta, Shiro: *See*—
Fukuda, Tamotsu; Shigeta, Shiro; Okuya, Hiroaki; Kuroiwa, Yasuyuki; and Sudo, Tadashi, 4,702,910, Cl. 424-92.000.
Shikano, Hiroshi: *See*—
Hamano, Tsutomu; and Shikano, Hiroshi, 4,702,629, Cl. 400-56.000.
Shillington, Richard A.; and Oberschmidt, Alec, to Med-Safe Systems, Inc. Hospital in-room disposable container. 4,702,385, Cl. 220-18.000.
Shimada, Kazuyuki: *See*—
Mochimaru, Hideaki; Shimada, Kazuyuki; and Hirasawa, Junichi, 4,703,334, Cl. 346-160.000.
Shimadzu Corporation: *See*—
Nishimura, Takashi, 4,703,437 Cl. 364-498.000.
Shimano, Hiroki; Shimizu, Masahiro; Tsukamoto, Katsuhiro; and Inuishi, Masahide, to Mitsubishi Denki Kabushiki Kaisha. Method of manufacturing semiconductor memory device. 4,702,797, Cl. 156-653.000.
Shimizu, Isamu: *See*—
Ishihara, Shunichi; Saito, Keishi; Oda, Shunri; and Shimizu, Isamu, 4,702,934, Cl. 427-39.000.
Shimizu, Masahiro: *See*—
Shimano, Hiroki; Shimizu, Masahiro; Tsukamoto, Katsuhiro; and Inuishi, Masahide, 4,702,797, Cl. 156-653.000.
Shimizu, Nobuaki: *See*—
Tsubouchi, Toshiyuki; Minokami, Tomiyasu; and Shimizu, Nobuaki, 4,703,124, Cl. 546-352.000.
Shimizu, Senzo; Nomura, Isao; and Narita, Kenichi, to Mitsubishi Gas Chemical Company, Inc. Electrically conductive polyamide resin composition. 4,702,859, Cl. 252-511.000.
Shimozawa, Toru; Nishimatsu, Masaharu; and Saito, Yoshiaki, to TDK Corporation. Magnetic recording medium. 4,702,959, Cl. 428-323.000.
Shinagawa, Hideo: *See*—
Nakata, Atsuo; and Shinagawa, Hideo, 4,703,005, Cl. 435-68.000.
Shinano Tokki Corporation: *See*—
Yazaki, Asao; Sunaba, Takashi; and Takemura, Yoshihiro, 4,703,211, Cl. 310-179.000.
Shinoda, Takashi; and Sakai, Osamu, to Hitachi, Ltd. Semiconductor memory with an improved dummy cell arrangement and with a built-in error correcting code circuit. 4,703,453, Cl. 365-104.000.
Shiomi, Masuo; and Aramaki, Takashi, to Sharp Kabushiki Kaisha. Blinking of a specific graph in a graphic display. 4,703,317, Cl. 340-723.000.
Shionogi & Co., Ltd.: *See*—
Adachi, Ikuo; Hiramatsu, Yoshiharu; Ueda, Motohiko; and Kawakami, Masaru, 4,703,051, Cl. 514-291.000.
Fujimoto, Manabu, 4,702,704, Cl. 434-295.000.
Shipley, Fred J.: *See*—
Bender, Herman G.; Shipley, Fred J.; and Vance, Gary C., 4,703,372, Cl. 360-96.100.
Shirahata, Ryuji: *See*—
Yasunaga, Tadashi; Yanai, Akio; and Shirahata, Ryuji, 4,702,938, Cl. 427-132.000.
Shirakawa, Kiyoshi: *See*—
Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.
Shirco Infrared Systems, Inc.: *See*—
Welsh, James N., 4,702,178, Cl. 110-193.000.
Shmuel, Reich: *See*—
Berliner, Shlomo; Vered, Areyh; Shmuel, Reich; and Vaige, Moshe, 4,703,259, Cl. 324-95.000.
Shop-Vac Corporation: *See*—
Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., 4,701,969, Cl. 15-79.00R.
Shor, Ehud. Electronic slide projector providing chroma and luma inversion of a composite video signal. 4,703,360, Cl. 358-214.000.
Short Brothers PLC: *See*—
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Sekiguchi, Yoshishige; and Kubota, Tomiyasu, 4,703,492, Cl. 373-91.000.
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Sieber-Gadient, Paul. Self-adhesive tape with two-sided contact adhesive coating and method of producing the same. 4,702,948, Cl. 428-40.000.
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Biermeier, Johann; Olbrich, Otto; and Dierkes, Albert, 4,703,374, Cl. 360-98.000.
Birk, Adalbert; and Saugeon, Ulrich, 4,703,440, Cl. 364-521.000.
Bohnen, Peter; Godesa, Ladvik; Kugler, Reinhard; and Marquardt, Ulrich, 4,703,137, Cl. 200-50.0AA.
Brumme, Gerhard; and Paur, Konrad, 4,703,490, Cl. 372-86.000.
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Einsle, Guenter; and Mayr, Ernst, 4,702,404, Cl. 226-7.000.
Hildebrand, Reinhard; and Kusuma, Djuanarto-Adi, 4,702,155, Cl. 98-2.000.
Konig, Gerhard; Fleck, Karl; Kess, Herbert; and Weigand, Artur, 4,701,974, Cl. 15-323.000.
Loeffler, Wilfried; and Oppelt, Arnulf, 4,703,271, Cl. 324-309.000.
Moyaert, Werner, 4,702,545, Cl. 439-856.000.
Schewe, Herbert; and Diepers, Heinrich, 4,703,382, Cl. 360-125.000.
Vieth, Michael, 4,703,177, Cl. 250-327.200.
Zibis, Peter; and Veith, Richard, 4,703,290, Cl. 333-195.000.
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Siemon, John A., 4,702,540, Cl. 439-371.000.
Siemon, John A., to Siemon Company, The. Electrical connector hold-down adaptor. 4,702,540, Cl. 439-371.000.
Sigley, Gordon B. Sextant having a microprocessor for calculating the position of heavenly bodies. 4,702,011, Cl. 33-268.000.
Signal Applied Technologies, Inc.: *See*—
Onal, Isik, 4,702,897, Cl. 423-213.500.
Signetics Corporation: *See*—
Cavlan, Napoleone, 4,703,206, Cl. 307-465.000.

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Camaggi, Giovanni; Gozzo, Franco; Signorini, Ernesto; and Palla, Ottorino, 4,702,762, Cl. 71-90.000.
Silver, Frederick A.; Berg, Richard A.; Birk, David E.; Weadock, Kevin; and Whyne, Conrad, to University of Medicine & Dentistry of New Jersey. Biodegradable matrix and methods for producing same. 4,703,108, Cl. 530-356.000.
Simington, Jack F., to Simington Products Company. Livestock head holder. 4,702,200, Cl. 119-99.000.
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Simington, Jack F., 4,702,200, Cl. 119-99.000.
Simon-Barron Limited: *See*—
Finch, Maurice, 4,702,746, Cl. 44-14.000.
Simon, James A., to Eye Pro, Inc. Protective eyewear. 4,701,962, Cl. 2-15.000.
Simon, Jean-Jacques: *See*—
Caine, Nathanael T.; and Simon, Jean-Jacques, 4,703,473, Cl. 370-15.000.
Simon, Richard: *See*—
Coles, Harry J.; and Simon, Richard, 4,702,558, Cl. 350-330.000.
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Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., 4,702,172, Cl. 102-521.000.
Simpkins, Timothy M.: *See*—
Best, Christopher H.; Lakin, David F.; and Simpkins, Timothy M., 4,702,212, Cl. 123-472.000.
Simpson, Dennis A.: *See*—
Singer, Debra L.; Dowbenko, Rostyslaw; and Simpson, Dennis A., 4,703,101, Cl. 528-87.000.
Sinclair, William J.: *See*—
Duck, Gary S.; and Sinclair, William J., 4,702,549, Cl. 350-96.150.
Singer Company, The: *See*—
Lotz, Robert W., 4,703,439, Cl. 364-521.000.
Singer, Debra L.; Dowbenko, Rostyslaw; and Simpson, Dennis A., to PPG Industries, Inc. Liquid crosslinkable compositions using polyepoxides and polyacids. 4,703,101, Cl. 528-87.000.
Sircar, Shivaji; and Golden, Timothy C., to Air Products and Chemicals, Inc. Technique for surface oxidation of activated carbon. 4,702,749, Cl. 55-33.000.
Siskind, Gregory W.: *See*—
Becker, Carl G.; Francus, Tova; and Siskind, Gregory W., 4,702,907, Cl. 424-88.000.
Sisun, Henry: *See*—
Powers, Whitney R.; and Sisun, Henry, 4,702,732, Cl. 604-20.000.
Siwik, James C.: *See*—
Goss, Gary J.; Holtey, Thomas O.; and Siwik, James C., 4,703,322, Cl. 340-750.000.
SKF GmbH: *See*—
Scholl, Herbert; and Brockmuller, Uwe, 4,702,626, Cl. 384-477.000.
Skiles, Jerry W.: *See*—
Huang, Fu-chih; Suh, John T.; and Skiles, Jerry W., 4,703,037, Cl. 514-19.000.
Skinner, Harry W.; Skinner, James W.; O'Donnell, William P.; and Skinner, William O., to Press-Seal Gasket Corporation. Slipline adjustable manhole seal. 4,702,645, Cl. 405-154.000.
Skinner, James W.: *See*—
Skinner, Harry W.; Skinner, James W.; O'Donnell, William P.; and Skinner, William O., 4,702,645, Cl. 405-154.000.
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Slosberg, David K.; Reece, David S.; and Claessen, Johannes A. H., to Heuga Holding bv. Bitumen backed carpet tile and method of production. 4,702,950, Cl. 428-95.000.
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Nieuwendijk, Joris A. M.; Heijnemans, Werner A. L.; Sluijterman, Albertus A. S.; and Vink, Nicolaas G., 4,703,232, Cl. 315-370.000.
Smailos, Emanuel: *See*—
Koester, Rainer; Smailos, Emanuel; Schwarzkopf, Werner; and Kiesow, Arthur, 4,702,391, Cl. 220-456.000.
Smit, Edward H.; Sukup, Charles E.; and Sukup, Eugene G., to Sukup Manufacturing Company. Ridge tillage attachment for planters. 4,702,323, Cl. 172-156.000.
Smith, David A.; and Geiger, Herbert B., to Dow Chemical Company, The. Article transport arrangement. 4,702,471, Cl. 271-284.000.
Smith, Donald C.; Snow, Richard F.; and Pauli, George B., to Crouse-Hinds Company. Post top luminaire. 4,703,403, Cl. 362-268.000.
Smith, Ronald D. Emergency air supply apparatus. 4,702,243, Cl. 128-205.240.
Smith, William D.: *See*—
Gaulding, William R.; Smith, William D.; and Marsh, Nicholas C., 4,702,653, Cl. 410-144.000.
SmithKline Beckman Corporation: *See*—
Mutschler, Carl E.; and Warner, Mark E., 4,702,595, Cl. 356-39.000.
Smiths Industries Public Limited Company: *See*—
Brooks, Kenneth J.; Wilkinson, Michael A.; Hannam, Peter H.; and Whiteside, Neil A., 4,702,252, Cl. 128-344.000.
Snee, Ronald W., to Safetran Systems Corporation. Solid state railroad lights/gate controller. 4,703,303, Cl. 340-47.000.
Snow, Harold. Hand driven precision tapping system. 4,702,131, Cl. 81-177.500.
Snow, Richard F.: *See*—
Smith, Donald C.; Snow, Richard F.; and Pauli, George B., 4,703,403, Cl. 362-268.000.
Snyder, Daniel R.: *See*—
Luther, Ronald B.; Snyder, Daniel R.; and Whitehouse, Craig M., 4,702,735, Cl. 604-161.000.
Snyder, Kenneth L., Jr.; and Evani, Syamalarao, to Dow Chemical Company, The. Water-based hydraulic fluids comprising poly-oxazines or poly-oxazolines. 4,702,854, Cl. 252-75.000.
Sobiepanek, Janusz: *See*—
Aboukrat, Simon; Catoir, Lucien; Guatelli, Jean-Luc; and Sobiepanek, Janusz, 4,703,212, Cl. 310-218.000.
Sobstad Sailmakers, Inc.: *See*—
Conrad, Peter G., 4,702,190, Cl. 114-103.000.
Societa' Cavi Pirelli S.p.A.: *See*—
Magnani, Francesco; and Invernizzi, Attilio, 4,703,135, Cl. 174-135.000.
Societe Anonyme dite: L'Oreal: *See*—
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,702,906, Cl. 424-70.000.
Societe de Conseils de Recherches et d'Applications Scientifiques: *See*—
Guinot, Philippe M., 4,703,045, Cl. 514-159.000.
Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See*—
Franceschini, Jacqueline; Gardaix-Luthereau, Renee; and Margarit, Josette, 4,703,055, Cl. 514-400.000.
Societe pour l'Etude de la Fabrication des Circuits Integres Speciaux - E.F.C.I.S.: *See*—
Zangara, Louis, 4,703,200, Cl. 307-279.000.
Soda, Yutaka: *See*—
Imakoshi, Shigeyoshi; Suyama, Hideo; Soda, Yutaka; Fukuyama, Munekatsu; and Iida, Yasuhiro, 4,703,378, Cl. 360-113.000.
Sofy, Hugh M., to HMS Products Co. Combination electric and mechanical servo drive clutch. 4,702,363, Cl. 192-150.000.
Sohn, Sang H., to Gold Star Co., Ltd. Plasma display device. 4,703,225, Cl. 313-587.000.
Solarek, Daniel B.; Jobe, Patrick G.; Tessler, Martin M.; Billmers, Robert L.; Lamb, Diane J.; and Tsai, John J., to National Starch and Chemical Corporation. Polysaccharide derivatives containing aldehyde groups, their preparation from the corresponding acetals and use as paper additives. 4,703,116, Cl. 536-104.000.
Sollami, Jimmie L.: *See*—
Sollami, Phillip A.; and Sollami, Jimmie L., 4,702,525, Cl. 299-79.000.
Sollami, Phillip A.; and Sollami, Jimmie L. Conical bit. 4,702,525, Cl. 299-79.000.
Sollars, John A., Jr., to Milliken Research Corporation. Pile lay measurement system. 4,702,597, Cl. 356-138.000.
Solomon, James R. Golf putter. 4,702,477, Cl. 273-80.00C.
Sommacal, Franco: *See*—
Guerrini, Giampaolo; and Sommacal, Franco, 4,702,107, Cl. 73-319.000.
Sommers, Dale C.; Hibberd, Frank L.; and Jayko, Doreen M. Ultraminiature collapsible butane fueled mantle lantern. 4,702,690, Cl. 131-110.000.
Sonnenberg, Fred M., to Atlantic Richfield Company. Foam cups with enhanced coffee retention. 4,703,065, Cl. 521-57.000.
Sontheimer, Carl G.; and Williams, James E., to Cuisinarts, Inc. Salad spinner dryer apparatus rotated by speed reducing friction drive for use wih food processors. 4,702,162, Cl. 99-495.000.
Sony Corporation: *See*—
Baba, Hideyuki; and Mitsumori, Shigeyoshi, 4,703,468, Cl. 369-44.300.
David, Morgan W. A., 4,703,353, Cl. 358-140.000.
Hayafuji, Yoshinori, 4,703,256, Cl. 324-71.300.
Iguchi, Yukinobu; Murakami, Kanemitsu; and Kikuchi, Masahiro, 4,703,223, Cl. 313-414.000.
Imakoshi, Shigeyoshi; Suyama, Hideo; Soda, Yutaka; Fukuyama, Munekatsu; and Iida, Yasuhiro, 4,703,378, Cl. 360-113.000.
Kawada, Hideaki; Ike, Kazuo; Nemoto, Tsuneo; and Omori, Kiyoshi, 4,703,384, Cl. 360-132.000.
Kondo, Tetsujiro, 4,703,351, Cl. 358-135.000.
Kondo, Tetsujiro, 4,703,352, Cl. 358-135.000.
Matsuzaki, Atsushi; and Saito, Mitsumasa, 4,703,345, Cl. 358-74.000.
Okanobu, Taiwa, 4,703,292, Cl. 334-15.000.
Umezu, Mitsuo, 4,703,508, Cl. 381-188.000.
Yamoto, Hisayoshi; and Suzuki, Hideo, 4,702,937, Cl. 437-233.000.
Soumiya, Masato: *See*—
Tokura, Norihito; Kawai, Hisasi; Goto, Masahiro; Morino, Seiji; and Soumiya, Masato, 4,702,221, Cl. 123-606.000.
Sousa, David W. Bite indicator for fishing gear. 4,702,031, Cl. 43-17.000.
Southwestern Engineering Company: *See*—
Noe, Renato R.; and Yarden, Abraham L., 4,702,308, Cl. 165-76.000.
Spacelabs, Inc.: *See*—
Bender, Herman G.; Shipley, Fred J.; and Vance, Gary C., 4,703,372, Cl. 360-96.100.
Spackman, Ramon: *See*—
Clayton, Colin G.; and Spackman, Ramon, 4,702,379, Cl. 209-539.000.
Spani, Wayne M., to Fisher Scientific Group, Inc. Empty container detector with drop sensor. 4,703,314, Cl. 340-619.000.
Speaight, David C.: *See*—
Munro, Robert; and Speaight, David C., 4,702,151, Cl. 92-237.000.
Spector, George: *See*—
Salazar, Don, Jr.; and Spector, George, 4,702,451, Cl. 248-309.100.

Speer, William D. Passive dehumidification of attic and crawl space of buildings. 4,702,149, Cl. 98-37.000.

Speet, Larry A.; and Rentz, Bruce A., to Steelcase, Inc. Power receptacle and associated filter. 4,703,386, Cl. 361-56.000.

Spencer, Treesa A. Disposable hypodermic syringe and needle combination having retractable, accident preventing sheath. 4,702,738, Cl. 604-198.000.

Sperinck, John: *See*—
Jenkins, John E.; Sperinck, John; and Buller, Michael J., 4,702,071, Cl. 60-39.092.

Spiess, Joachim: *See*—
Rivier, Jean E. F.; Spiess, Joachim; and Vale, Wylie W., Jr., 4,703,035, Cl. 514-12.000.

SPM Manufacturing Corporation: *See*—
Shaine, William L., 4,702,026, Cl. 40-159.000.

Spreen, James H., to International Business Machines Corporation. Coupled power supply inductors for reduced ripple current. 4,703,409, Cl. 363-45.000.

Spurgeon, Roger. Activator fluid for water remoistenable glue. 4,702,774, Cl. 106-287.240.

Spymark, Incorporated: *See*—
Storms, Harrison A., Jr.; and Cockerell, William C., Jr., 4,703,444, Cl. 364-561.000.

Square D Starkstrom GmbH: *See*—
Grunst, Heinz, 4,703,141, Cl. 200-340.000.

SRO Kugellagerwerke, J. Schmid-Roost: *See*—
Borel, Denis, 4,702,623, Cl. 384-45.000.

Staar Surgical Company: *See*—
Mazzocco, Thomas R., 4,702,244, Cl. 128-303.00R.

Stadtfeld, Gerhard: *See*—
Monheim, Peter; and Stadtfeld, Gerhard, 4,702,303, Cl. 164-491.000.

Stageboe, Jan; and Gjeruldsen, Erik. Tension leg platform. 4,702,648, Cl. 405-224.000.

Standard Electrik Lorenz: *See*—
Zondler, Rolf; and Pottharst, Jurgen, 4,702,559, Cl. 350-331.00R.

Standard Machinery Limited: *See*—
Greasley, Michael J.; and Manning, Richard J., 4,702,183, Cl. 112-38.000.

Standard Manufacturing Co., Inc.: *See*—
Oswald, Norman D.; Mankey, Harry S.; Franklin, Carl M.; Wilhelm, James M.; and Osborn, Ronnie M., 4,702,843, Cl. 280-707.000.

Standard Oil Company, The: *See*—
Tenhover, Michael A., 4,702,813, Cl. 204-290.00R.

Standard Telephones and Cables Public Limited Company: *See*—
Camp, Philip G.; Macklen, Eric D.; Hole, Victor H. R.; and Hutcherson, David R., 4,702,619, Cl. 374-144.000.

Stanley, Edward T. Thermal liner for gun firing chamber. 4,702,027, Cl. 42-76.020.

Stanley Electric Co., Ltd.: *See*—
Ichihara, Takeo; Watanabe, Shuichi; Futami, Takashi; and Oda, Nobutaka, 4,703,401, Cl. 362-80.000.

Stark, Gerald A.: *See*—
Happ, Lawrence R.; Stark, Gerald A.; and Drensky, Stephen M., 4,703,147, Cl. 219-10.55C.

Stark, Willi: *See*—
Rohleder, Klaus; and Stark, Willi, 4,702,949, Cl. 428-92.000.

State of Israel, Ministry of Defence, Israel Military Industries, The: *See*—
Tal, Reuven; Chaiat, Dov; and Hirsch, Eitan, 4,702,171, Cl. 102-476.000.

STC plc: *See*—
Ayliffe, Peter J., 4,703,305, Cl. 340-784.000.

Stearns, Hoyt A., Jr. Electric air-driven helicopter. 4,702,437, Cl. 244-17.110.

Steelcase, Inc.: *See*—
Speet, Larry A.; and Rentz, Bruce A., 4,703,386, Cl. 361-56.000.

Steinback, Clarence I.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.

Steiniger, Michael; and Stroefer, Eckhard, to BASF Aktiengesellschaft. Preparation of pyrazoles. 4,702,803, Cl. 204-59.00R.

Steininger, Helmut, to Battelle - Institut e.V. Carrier for the manufacture of abrasion-resistant catalysts, process for the production of the carrier and catalyst deposited on the carrier. 4,703,028, Cl. 502-178.000.

Steininger, Helmut: *See*—
Heide, Helmut; Etzkorn, Heinz-Werner; Poeschel, Eva; and Steininger, Helmut, 4,702,930, Cl. 427-2.000.

Stenstrom, Lennart, to Asea Aktiebolag. Protective circuit for series capacitor banks. 4,703,385, Cl. 361-16.000.

Stepper, Inc.: *See*—
Hannon, Charles N., 4,702,467, Cl. 271-133.000.

Stern, Howard; and Mauro, Alex, to Robotic Vision Systems, Inc. Rocker arm sensor. 4,702,605, Cl. 356-375.000.

Stevens, Gerald S., Jr., to General Instrument Corp. High speed spark jet printer. 4,703,331, Cl. 346-140.00R.

Stewart, Walter F.: *See*—
Barclay, John A.; Stewart, Walter F.; Prenger, F. Coyne; Zimm, Carl B.; and Parsons, John P., 4,702,090, Cl. 62-3.000.

Steyr-Daimler-Puch AG: *See*—
Zedrosser, Ulrich, 4,702,144, Cl. 89-1.400.

Stipanuk, James J., to Motorola, Inc. Circuit for writing bipolar memory cells. 4,703,458, Cl. 365-189.000.

Stoian, Anatol; Panaitescu, Nicolita; and Tuliu, Marioara, to Institutul de Cercetari Si Proiectari Pentru Petrol Si Gaze. Process of organic material extraction from bituminous sands or oil bearing sands. 4,702,487, Cl. 208-390.000.

Stokes, Bruce F., to Baramac Corporation Limited. Ground anchors. 4,702,047, Cl. 52-156.000.

Stoltzman, Gary L. Portable golf ball washer. 4,701,968, Cl. 15-21.00A.

Stone, Thomas R.: *See*—
Hahn, Peter S.; Stone, Thomas R.; Moon, William G.; and Harrison, Joel N., 4,703,176, Cl. 250-231.0SE.

Storms, Harrison A., Jr.; and Cockerell, William C., Jr., to Spymark, Incorporated. Systems for determining distances to and locations of features on a golf course. 4,703,444, Cl. 364-561.000.

Stowe, Ian: *See*—
Catala, Gerard; Stowe, Ian; and Henry, Daniel, 4,703,427, Cl. 364-422.000.

Stowe, Richard W.: *See*—
Wood, Charles H.; and Stowe, Richard W., 4,703,173, Cl. 250-227.000.

Straub, Dale K.: *See*—
Kalt, Glenda; Straub, Dale K.; and Piwonka, Peter, 4,702,736, Cl. 604-180.000.

Strobel, Mark J. Hydraulic unit for waterbed, and method of forming. 4,701,967, Cl. 5-450.000.

Stroefer, Eckhard: *See*—
Steiniger, Michael; and Stroefer, Eckhard, 4,702,803, Cl. 204-59.00R.

Strom, Edwin T.: *See*—
Chung, Harold S.; Jennings, Alfred R., Jr.; and Strom, Edwin T., 4,702,316, Cl. 166-272.000.
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Strom, Rolf: *See*—
Heinonen, Jarmo; Wisakanto, Risto; and Strom, Rolf, 4,702,621, Cl. 384-37.000.

Strommen, Roe. Probe for monitoring the corrosion of a steel reinforcement member in a concrete body. 4,703,253, Cl. 324-65.0CR.

Strommen, Roe. Probe for corrosion testing. 4,703,254, Cl. 324-65.0CR.

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Struck, Bernd D.: *See*—
Naoumidis, Aristides; Neumeister, Herbert; Schirbach, Arno; Struck, Bernd D.; and Triefenbach, Dieter, 4,702,784, Cl. 156-89.000.

Struck, Carl-Julius, to Boehringer Ingelheim KG. Monoclonal antibody with a high affinity for digoxin. 4,703,003, Cl. 435-68.000.

Strydom, Mauritz L., to Tobacco Research and Development Institute Limited. Tobacco smoke filters. 4,702,263, Cl. 131-336.000.

Stucker, David L., to Westinghouse Electric Corp. Quick disconnect top nozzle for a nuclear fuel assembly. 4,702,882, Cl. 376-446.000.

Studer, Bruno, to ETA SA Fabriques d'Ebauches. Process for manufacturing high frequency quartz resonators. 4,701,987, Cl. 29-25.350.

Sturm, Hans, to Mannesmann AG. Method for automatically adjusting the rolls in a universal type mill stand. 4,702,099, Cl. 72-366.000.

Sudo, Tadashi: *See*—
Fukuda, Tamotsu; Shigeta, Shiro; Okuya, Hiroaki; Kuroiwa, Yasuyuki; and Sudo, Tadashi, 4,702,910, Cl. 424-92.000.

Sueyoshi, Susumu; Tokui, Satoru; and Nanba, Keiichiro, to Pioneer Electronic Corporation. Interface device. 4,703,450, Cl. 364-900.000.

Sugai, Yoshiro; and Kimura, Hiroyuki, to Pioneer Electronic Corporation. Sound multiplex receiver. 4,703,501, Cl. 381-10.000.

Sugihara, Masahiro: *See*—
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,681, Cl. 418-55.000.
Inaba, Tsutomu; Sugihara, Masahiro; Nakamura, Toshiyuki; Oide, Masahiko; Kimura, Tadashi; and Kobayashi, Norihide, 4,702,682, Cl. 418-55.000.
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Sugisawa, Ko; Yamamoto, Masanori; and Nakanaga, Ryusuke, to House Food Industrial Company Limited. Container heated by microwave oven. 4,703,149, Cl. 219-10.55E.

Sugita, Katsuhiko, to Tsudakoma Corp. Weft insertion control method and device for carrying out the same. 4,702,285, Cl. 139-452.000.

Sugiyama, Norihide; Funato, Katsuro; Nagase, Hiroshi; Yamamoto, Seiichi; and Miyamori, Shigeo, to Fujikura Kasei Co., Ltd. Process for producing pressure-fixable electrophotographic toners. 4,702,989, Cl. 430-137.000.

Suh, John T.: *See*—
Huang, Fu-chih; Suh, John T.; and Skiles, Jerry W., 4,703,037, Cl. 514-19.000.

Suhajda, John I., to S. C. Johnson & Son, Inc. Electric fogger. 4,703,155, Cl. 219-271.000.

Sukup, Charles E.: *See*—
Smit, Edward H.; Sukup, Charles E.; and Sukup, Eugene G., 4,702,323, Cl. 172-156.000.

Sukup, Eugene G.: *See*—
Smit, Edward H.; Sukup, Charles E.; and Sukup, Eugene G., 4,702,323, Cl. 172-156.000.

Sukup Manufacturing Company: *See*—
Smit, Edward H.; Sukup, Charles E.; and Sukup, Eugene G., 4,702,323, Cl. 172-156.000.

Sullivan, Dennis; and Bloch, Richard J., to Carolina Power & Light Company. Forming stable welded joints between dissimilar metals. 4,702,406, Cl. 228-200.000.
Sulzer Brothers Limited: *See*—
Herzog, Rudolf, 4,702,306, Cl. 165-36.000.
Sumitomo Chemical Company, Limited: *See*—
Nakayama, Koji; Yoshida, Ryo; and Morita, Kouichi, 4,702,764, Cl. 71-92.000.
Sumitomo Electric Industries, LTD.: *See*—
Odani, Yusuke; Akechi, Kiyoaki; and Kuroishi, Nobuhito, 4,702,885, Cl. 419-23.000.
Sawada, Kazuo, 4,702,302, Cl. 164-463.000.
Sun High Teck Kabushiki Kaisha: *See*—
Nohda, Masao, 4,702,596, Cl. 356-126.000.
Sun Metal Products, Inc.: *See*—
Sacks, Martin B., 4,702,528, Cl. 301-99.000.
Sunaba, Takashi: *See*—
Yazaki, Asao; Sunaba, Takashi; and Takemura, Yoshihiro, 4,703,211, Cl. 310-179.000.
Sundermann, Erich; Reye, Hans; and Abel, Otto, to Perfluktiv Technik AG. Active coke produced from pit coal and production process thereof. 4,703,032, Cl. 502-413.000.
Surfax (Societe a Responsabilite Limitee): *See*—
Miller, Gilles; and Rivasson, Yves, 4,702,806, Cl. 204-106.000.
Sutherland, Donald J. Fuel vaporization and pressurization system for an internal combustion engine. 4,702,217, Cl. 123-523.000.
Suyama, Hideo: *See*—
Imakoshi, Shigeyoshi; Suyama, Hideo; Soda, Yutaka; Fukuyama, Munekatsu; and Iida, Yasuhiro, 4,703,378, Cl. 360-113.000.
Suzuki, Funihiko, to Kabushiki Kaisha Kotobuki. Apparatus for turning up and down seats for a telescopic seating system. 4,702,043, Cl. 52-9.000.
Suzuki, Hideo: *See*—
Yamoto, Hisayoshi; and Suzuki, Hideo, 4,702,937, Cl. 437-233.000.
Suzuki, Nobuhiro, to Futaba Denshi Kogyo Kabushiki Kaisha. Motor servo system. 4,703,241, Cl. 318-599.000.
Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Zero setting device in surveying instrument. 4,702,008, Cl. 33-1.00T.
Suzuki, Shinichi: *See*—
Takenaka, Kenji; Suzuki, Shinichi; Kayukawa, Hiroaki; and Ohta, Masaki, 4,702,677, Cl. 417-222.000.
Suzuki, Shoji, to Alpine Electronics Inc. Protected switch unit for cassette tape recorder. 4,703,138, Cl. 200-61.58R.
Suzuki, Sigeo: *See*—
Yasuda, Kazuyuki; and Suzuki, Sigeo, 4,703,021, Cl. 501-87.000.
Svensson, Kennet, to AB Siwertell. Loading device for a belt conveyor. 4,702,367, Cl. 198-550.900.
Swan, Leo, to Equipment Development Company, Inc. Diamond grinder assembly and snap-fit mounting means for scarifier case. 4,702,223, Cl. 125-3.000.
Swann, Peter R.; and Kraus, Bernd, to Gatan Inc. Anti-drift device for side entry electron microscope specimen holders. 4,703,181, Cl. 250-442.100.
Swarts, Richard E.: *See*—
Fournier, Joseph T., Jr.; and Swarts, Richard E., 4,703,287, Cl. 332-7.510.
Swedlow, Inc.: *See*—
Ashlock, Lysander T.; Mukamal, Harold; and White, William H., 4,702,773, Cl. 106-287.120.
Sweigart, Gerhard: *See*—
Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, 4,702,518, Cl. 296-217.000.
SWF Auto-Electric GmbH: *See*—
Prohaska, Hans, 4,701,971, Cl. 15-250.210.
Swiss Aluminium Ltd.: *See*—
Hofling, Erich; and Maly, Zdenek, 4,703,187, Cl. 250-571.000.
Sybert, Paul D.: *See*—
Wolfe, James F.; and Sybert, Paul D., 4,703,103, Cl. 528-179.000.
Symonds, Denzil J. W.: *See*—
Banks, John D.; Ball, Robert J.; and Symonds, Denzil J. W., 4,702,362, Cl. 192-98.000.
Synbiotics, Corporation: *See*—
Vodian, Morton A.; and Bean, Eric S., 4,703,001, Cl. 435-5.000.
Systems Efficiency Limited: *See*—
Williams, Colin W. F., 4,702,728, Cl. 474-148.000.
Szablikowski, Klaus: *See*—
Lange, Werner; Hohl, Frank; and Szablikowski, Klaus, 4,703,087, Cl. 525-161.000.
Szatkowski, Paul R.: *See*—
Louderback, Allan L.; and Szatkowski, Paul R., 4,703,013, Cl. 436-12.000.
Szell nee Hasenohrl, Erzsbet: *See*—
Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.
T. Y. Lin International: *See*—
Chow, Philip Y., 4,702,052, Cl. 52-224.000.
Tabacco, Alessandro; Moda, Edoardo; and Tarli, Paolo, to Sclavo, S.p.A. Method and reactive composition suitable for the colorimetric determination of metals. 4,703,015, Cl. 436-74.000.
Tacan Corporation: *See*—
Salour, Michael M.; Schoner, Gerhard; Bechtel, James H.; and Kull, Martin, 4,703,175, Cl. 250-227.000.
Tadokoro, Tomoo; Okimoto, Haruo; and Akagi, Toshimichi, to Mazda Motor Corporation. Supercharged engine. 4,702,219, Cl. 123-559.000.
Taga Electric Co., Ltd.: *See*—
Mishiro, Shoji, 4,703,214, Cl. 310-328.000.
Taga, Yutaka; Kubo, Seitoku; Kashihara, Yuji; Morisawa, Kunio; Takada, Mitsuru; and Nakamura, Yasunari, to Toyota Jidosha Kabushiki Kaisha. Four wheel drive vehicle slippage control device and method limiting center differential action according to input torque supplied thereto. 4,702,341, Cl. 180-249.000.
Taga, Yutaka: *See*—
Nakamura, Shinya; Kubo, Seitoku; and Taga, Yutaka, 4,702,083, Cl. 60-721.000.
Taggi, Arthur J.: *See*—
El-Sayed, Lyla M.; and Taggi, Arthur J., 4,702,984, Cl. 430-115.000.
Tahara, Akinori: *See*—
Enomoto, Hiromu; Yasuda, Yasushi; Tahara, Akinori; and Kumagai, Masao, 4,703,202, Cl. 307-443.000.
Tahara, Kazuo: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, 4,703,210, Cl. 310-154.000.
Tai, King L.: *See*—
Frye, Robert C.; and Tai, King L., 4,703,288, Cl. 333-1.000.
Taiyo Kogyo Co., Ltd.: *See*—
Minami, Hirokazu; Ishizu, Nobuhiko; and Ota, Matsuo, 4,702,191, Cl. 114-106.000.
Takada, Mitsuru: *See*—
Taga, Yutaka; Kubo, Seitoku; Kashihara, Yuji; Morisawa, Kunio; Takada, Mitsuru; and Nakamura, Yasunari, 4,702,341, Cl. 180-249.000.
Takagi, Kazutoshi: *See*—
Yoshino, Hisakazu; Nishimura, Shinichi; and Takagi, Kazutoshi, 4,702,570, Cl. 350-516.000.
Takagi, Seiichi: *See*—
Imai, Eiichi; Sakashita, Kiichiro; Takagi, Seiichi; and Kukimoto, Tsutomo, 4,702,986, Cl. 430-120.000.
Takagi, Yoshiaki; Katsui, Yoshihiro; Endo, Hiroyuki; and Ikenoue, Yutaka, to Hitachi Powdered Metals Co., Ltd.; and Honda Giken Kogyo Kabushiki Kaisha. Wear-resistant, sintered iron alloy and process for producing the same. 4,702,771, Cl. 75-241.000.
Takahara Shuzo Co., Ltd.: *See*—
Beppu, Teruhiko; Takesako, Kazutoh; Nakamura, Teruya; and Obayashi, Akira, 4,703,128, Cl. 549-270.000.
Takahashi, Hiroshi; Kakizaki, Tetsuji; Kato, Mitsuyoshi; and Nishida, Koji, to Mitsubishi Petrochemical Co., Ltd. Coated optical fiber. 4,702,554, Cl. 350-96.300.
Takahashi, Hiroshi, to NEC Corporation. Luminance/chrominance separating apparatus. 4,703,342, Cl. 358-31.000.
Takahashi, Hiroyuki; and Toyoshima, Isao, to Murata Manufacturing Co., Ltd. Piezo-electric assembly. 4,703,218, Cl. 310-348.000.
Takahashi, Mikio: *See*—
Kumazawa, Kiyotake; Minamide, Noriaki; Moribe, Yoshihiro; Takahashi, Mikio; Beppu, Osamu; and Mitamura, Masahiro, 4,703,242, Cl. 318-685.000.
Takahashi, Noriyoshi: *See*—
Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, 4,703,210, Cl. 310-154.000.
Takahashi, Toshihiko; Tarui, Toshimi; and Sato, Hiroshi, to Nippon Steel Corporation. Method for softening rolled medium carbon machine structural steels. 4,702,778, Cl. 148-12.00F.
Takami, Eiichi: *See*—
Tanaka, Hiroyuki; Takami, Eiichi; Mishima, Kyoichi; Higashi, Mitsunobu; and Kumasaki, Toshimi, 4,702,729, Cl. 474-205.000.
Takamisawa Electric Co., Ltd.: *See*—
Fujii, Kunihisa; Tomono, Noboru; Kito, Tetsuo; and Yoshino, Kosei, 4,703,295, Cl. 335-129.000.
Takao, Kunihiko; Kawashima, Kenichi; Nakamura, Yozo; and Kishi, Atsuo, to Hitachi, Ltd. Slide vane type compressor with increased suction part-cross-sectional area. 4,702,684, Cl. 418-259.000.
Takasawa, Ryuichi: *See*—
Matsuo, Shigeru; Murakami, Tomoyoshi; and Takasawa, Ryuichi, 4,703,104, Cl. 528-211.000.
Takase, Sadao: *See*—
Hosaka, Akio; and Takase, Sadao, 4,703,428, Cl. 364-424.100.
Takasugi, Eiji: *See*—
Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, 4,702,008, Cl. 33-1.00T.
Takata, Yatsuka; Yamada, Tadamasa; and Kikuchi, Eiki, to Aichi Steel Works, Ltd.; and Koyo Seiko Kabushiki Kaisha. Method of purifying a bearing steel. 4,702,767, Cl. 75-49.000.
Takeda Chemical Industries, Ltd.: *See*—
Kitamori, Nobuyuki; Maeno, Masaya; and Izuhara, Seiji, 4,702,919, Cl. 424-480.000.
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, to Mitsubishi Denki Kabushiki Kaisha. Low pressure mercury vapor discharge lamp and preparation thereof. 4,703,227, Cl. 313-634.000.
Takegahara, Takashi: *See*—
Kishi, Hajimu; Seki, Masaki; Takegahara, Takashi; and Onishi, Yasushi, 4,703,415, Cl. 364-170.000.
Takemura, Yoshihiro: *See*—
Yazaki, Asao; Sunaba, Takashi; and Takemura, Yoshihiro, 4,703,211, Cl. 310-179.000.
Takenaka, Kenji; Suzuki, Shinichi; Kayukawa, Hiroaki; and Ohta, Masaki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Vari-

able displacement wobble plate type compressor with improved wobble angle return system. 4,702,677, Cl. 417-222.000.

Takenaka, Toichi: *See*—
Imai, Kazuo; Niigata, Kunihiro; Fujikura, Takashi; Hashimoto, Shinichi; and Takenaka, Toichi, 4,703,063, Cl. 514-603.000.

Takeoka, Yoshikatsu; Ozawa, Norio; and Yasuda, Nobuaki, to Kabushiki Kaisha Toshiba. Optical type information recording medium and manufacturing method thereof. 4,702,991, Cl. 430-270.000.

Takesako, Kazutoh: *See*—
Beppu, Teruhiko; Takesako, Kazutoh; Nakamura, Teruya; and Obayashi, Akira, 4,703,128, Cl. 549-270.000.

Takeshima, Sadao; and Yabe, Hideo, to Jidosha Kiki Co., Ltd. Control device for power steering apparatus. 4,702,334, Cl. 180-142.000.

Taketani, Mitsuhiro, to Kabushiki Kaisha Toshiba. Sheet loading device and method for a printing apparatus. 4,702,632, Cl. 400-639.100.

Takeuchi, Kunihiko; and Morishige, Yuge, to Tokyo Keiki Company Ltd. Pulse motor control apparatus. 4,703,244, Cl. 318-696.000.

Takeuchi, Shoji: *See*—
Narishima, Wataru; and Takeuchi, Shoji, 4,703,160, Cl. 235-1.00D.

Takigawa, Tetsuo: *See*—
Kameyama, Tsutomu; Kitamura, Jiro; Takigawa, Tetsuo; and Mizuno, Masao, 4,703,061, Cl. 514-551.000.

Takiguchi, Takao: *See*—
Matsumoto, Masakazu; Takiguchi, Takao; Yamashita, Masataka; Umehara, Shoji; and Ishikawa, Shozo, 4,702,982, Cl. 430-72.000.

Takusagawa, Takashi: *See*—
Iwata, Norio; Nakamura, Masao; and Takusagawa, Takashi, 4,702,293, Cl. 152-531.000.

Tal, Reuven; Chaiat, Dov; and Hirsch, Eitan, to State of Israel, Ministry of Defence, Israel Military Industries, The. Hollow charges. 4,702,171, Cl. 102-476.000.

Tallman, Gary C. Sign sandblasting method. 4,702,786, Cl. 156-154.000.

Tamagaki, Hiroshi: *See*—
Yoshikawa, Kiyoshi; Toku, Hisayuki; Ueda, Makoto; and Tamagaki, Hiroshi, 4,703,222, Cl. 313-362.100.

Tamamura, Toshiaki: *See*—
Tanaka, Akinobu; Morita, Masao; Imamura, Saburo; Tamamura, Toshiaki; and Kogure, Osamu, 4,702,990, Cl. 430-197.000.

Tamura, Katsushige: *See*—
Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige; and Saijo, Hideo, 4,702,872, Cl. 264-114.000.

Tamura, Yoshikazu; and Kitajima, Katsuo, to Anelva Corporation. Power supply system for a quadrupole mass spectrometer. 4,703,190, Cl. 307-2.000.

Tanaka, Akinobu; Morita, Masao; Imamura, Saburo; Tamamura, Toshiaki; and Kogure, Osamu, to Nippon Telegraph and Telephone Corporation. Photosensitive resin composition and process for forming photo-resist pattern using the same. 4,702,990, Cl. 430-197.000.

Tanaka, Atsuyuki: *See*—
Nishiyama, Masaaki; and Tanaka, Atsuyuki, 4,703,438, Cl. 364-519.000.

Tanaka, Hatsuyuki: *See*—
Matsuno, Yutaka; Kumagai, Tadanobu; and Tanaka, Hatsuyuki, 4,701,982, Cl. 24-273.000.

Tanaka, Hiroyuki; Takami, Eiichi; Mishima, Kyoichi; Higashi, Mitsunobu; and Kumasaki, Toshimi, to Mitsuboshi Belting Ltd. Timing belt with controlled friction backside ribs. 4,702,729, Cl. 474-205.000.

Tanaka, Kazuo: *See*—
Kato, Masatake; Ikemori, Keiji; Tanaka, Tsunefumi; and Tanaka, Kazuo, 4,702,567, Cl. 350-427.000.

Tanaka, Kunimaro: *See*—
Ozaki, Minoru; and Tanaka, Kunimaro, 4,703,494, Cl. 375-19.000.

Tanaka, Kunio: *See*—
Kishi, Hajimu; Matsumura, Teruyuki; and Tanaka, Kunio, 4,703,441, Cl. 364-526.000.

Tanaka, M.; Kobayashi, Kazuhiro; and Koboshi, Shigeharu, to Konishiroku Photo Industry Co., Ltd. Processing solution for light-sensitive silver halide photographic material comprises metal complexes of large polyamine derivatives. 4,702,998, Cl. 430-430.000.

Tanaka, Masao; Watanabe, Okosu; and Inada, Koichi, to Fujikura Ltd. Apparatus for separating or synthesizing light signals. 4,702,548, Cl. 350-96.150.

Tanaka, Norihiko: *See*—
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, 4,703,227, Cl. 313-634.000.

Tanaka, Seiya, to Aisin Seiki Kabushiki Kaisha. Viscous fluid coupling. 4,702,360, Cl. 192-58.00B.

Tanaka, Tsunefumi: *See*—
Kato, Masatake; Ikemori, Keiji; Tanaka, Tsunefumi; and Tanaka, Kazuo, 4,702,567, Cl. 350-427.000.

Tandem Computers Incorporated: *See*—
Bailey, Carl J., 4,703,195, Cl. 307-147.000.

Tanigawa, Yasuo: *See*—
Iwao, Nomura; Masuyama, Takayuki; Tanigawa, Yasuo; and Hasimoto, Hirofumi, 4,702,666, Cl. 414-730.000.

Taniguchi, Hitoshi: *See*—
Hirotsuka, Motohiko; Harada, Tetsuro; Ohtsubo, Nobuhiro; Kawade, Hiroyuki; Hayakawa, Yoshiyuki; and Taniguchi, Hitoshi, 4,702,927, Cl. 426-467.000.

Taniguchi, Nobuyuki; Omaki, Takanobu; Ishikawa, Norio; Nakai, Masaaki; Ishida, Tokuji; and Hamada, Masataka, to Minolta Camera Kabushiki Kaisha. Automatic focusing camera. 4,702,584, Cl. 354-400.000.

Taniguchi, Yoshiteru: *See*—
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, 4,703,227, Cl. 313-634.000.

Tanimoto, Akikazu: *See*—
Matsuura, Toshio; Murakami, Seiro; Imai, Yuji; Ohta, Kazuya; and Tanimoto, Akikazu, 4,702,606, Cl. 356-401.000.

Tanioku, Shozo: *See*—
Mikita, Muneharu; Tanioku, Shozo; and Touda, Takayasu, 4,703,067, Cl. 521-63.000.

Tarabichy, Samih; and Miller, Barry. Revision arthroplasty method and related instrument. 4,702,236, Cl. 128-92.00V.

Target Concepts Inc.: *See*—
Kahl, William; and Settanni, Richard, 4,703,171, Cl. 250-221.000.

Tarleton, George K.: *See*—
Abrant, Robert J.; Martys, Michael D.; and Tarleton, George K., 4,703,421, Cl. 364-200.000.
Abrant, Robert J.; Martys, Michael D.; and Tarleton, George K., 4,703,452, Cl. 364-900.000.

Tarli, Paolo: *See*—
Tabacco, Alessandro; Moda, Edoardo; and Tarli, Paolo, 4,703,015, Cl. 436-74.000.

Taroni, Federico: *See*—
Ribolla, G. Carlo; Taroni, Federico; Peiretti, Domenico; and Pepino, Antonio, 4,701,985, Cl. 26-10.00C.

Tarrant, Dennis E.: *See*—
Hutter, Harold G.; and Tarrant, Dennis E., 4,702,536, Cl. 439-292.000.

Tarui, Toshimi: *See*—
Takahashi, Toshihiko; Tarui, Toshimi; and Sato, Hiroshi, 4,702,778, Cl. 148-12.00F.

Taya, Shunroku, to Hitachi, Ltd. Microwave discharge type ion source for ion injection devices. 4,703,180, Cl. 250-425.000.

Taylor, Bruce F.; and Hagen, Kenneth G., to Thermo Electron - Web Systems, Inc. Evaporative-cooling apparatus and method for the control of web or web-production machine component surface temperatures. 4,702,015, Cl. 34-20.000.

Taylor, Cheryl J. Activity book with removable manipulatives. 4,702,700, Cl. 434-168.000.

TCH Thermo-Consulting-Heidelberg GmbH: *See*—
Vinko, Mucic, 4,702,081, Cl. 60-655.000.

TDK Corporation: *See*—
Katoh, Tomio, 4,703,296, Cl. 335-208.000.
Shimozawa, Toru; Nishimatsu, Masaharu; and Saito, Yoshiaki, 4,702,959, Cl. 428-323.000.

Technomed International: *See*—
Mestas, Jean-Louis; and Cathignol, Dominique, 4,702,248, Cl. 128-328.000.

Technos et Compagnie: *See*—
Bizard, Andre, 4,702,311, Cl. 165-162.000.

Tedeschi, Anthony: *See*—
Prunesti, James; Bell, William D.; Gannaway, Jane P.; O'Boyle, Dolores; and Tedeschi, Anthony, 4,701,964, Cl. 2-406.000.

Tektronix, Inc.: *See*—
Enochs, R. Scott, 4,702,547, Cl. 350-96.200.
Pepper, Steven H., 4,703,410, Cl. 363-56.000.
Sherbeck, Terry G., 4,703,316, Cl. 340-706.000.
Woo, James, 4,703,285, Cl. 330-260.000.

Telectronics N.V.: *See*—
Nappholz, Tibor A.; Lubin, Mark; and Valenta, Harry L., Jr., 4,702,253, Cl. 128-419.0PG.

Temkin, Henryk: *See*—
Dolan, Gerald J.; Logan, Ralph A.; Temkin, Henryk; and Wilt, Daniel P., 4,701,995, Cl. 437-129.000.

Temperature Adjusters, Inc.: *See*—
Childs, Henry T., 4,702,179, Cl. 110-215.000.

Tenhover, Michael A., to Standard Oil Company, The. Multi-layered amorphous metal-based oxygen anodes. 4,702,813, Cl. 204-290.00R.

Tennessee Valley Authority: *See*—
Mair, Alexander D., 4,702,896, Cl. 423-167.000.

Terada, Yoshiyuki: *See*—
Yoshimoto, Yoshio; Kondoh, Minoru; and Terada, Yoshiyuki, 4,703,240, Cl. 318-587.000.

Teramachi, Hiroshi. Linear slide roller bearing unit. 4,702,622, Cl. 384-44.000.

Terranova, Victor P.; Wikesjo, Ulf M. E.; Genco, Robert J.; Hic, Susanne; and Lyall, Raymond M., to Meloy Laboratories, Inc. Method of promoting periodontal regeneration and fibroblast bonding. 4,702,734, Cl. 604-54.000.

Tesmann, Holger; Blum, Helmut; and Koester, Rita, to Henkel Kommanditgesellschaft auf Aktien. Phosphinic acid adducts with maleic acid semiesters, a process for their production and their use. 4,702,823, Cl. 209-166.000.

Tessler, Martin M.: *See*—
Solarek, Daniel B.; Jobe, Patrick G.; Tessler, Martin M.; Billmers, Robert L.; Lamb, Diane J.; and Tsai, John J., 4,703,116, Cl. 536-104.000.

Tetra Pak International AB: *See*—
Derving, Jackie, 4,702,410, Cl. 229-184.000.

Tewes, Udo: *See*—
Holland-Letz, Guenter; Jaeger, Waldemar; Tewes, Udo; and Weigel, Peter, 4,703,162, Cl. 235-379.000.

Texaco Inc.: *See*—
Huang, Wann-Sheng; and Hight, Margaret A., 4,702,314, Cl. 166-245.000.

Marquis, Edward T.; Sanderson, John R.; and Keating, Kenneth P., 4,703,027, Cl. 502-171.000.
Nussbaum, Theodore W.; Tooker, Keith R.; and Cox, Percy T., 4,703,278, Cl. 324-344.000.
Shen, Chin W., 4,702,317, Cl. 166-272.000.

Texas Instruments Incorporated: *See—*
Douglas, Monte A., 4,702,795, Cl. 156-643.000.
Flinchbaugh, Bruce E., 4,703,426, Cl. 364-421.000.
Gerson, Philips M., 4,703,298, Cl. 337-102.000.
Narishima, Wataru; and Takeuchi, Shoji, 4,703,160, Cl. 235-1.00D.

Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft: *See—*
Gunther, Feyerl; Kalteis, Augustin; and Hannes, Pum, 4,701,986, Cl. 28-142.000.

Tezuka, Junichi: *See—*
Murata, Yasuto; Tezuka, Junichi; and Yamamoto, Kenji, 4,702,811, Cl. 204-206.000.

Thann et Mulhouse: *See—*
Hoffner, Daniel A. E.; and Trautmann, Jean-Marie C., 4,702,776, Cl. 106-309.000.

Thau, Lawrence W., Jr.; and Dole, Douglas R., to Victaulic Company of America. Fire resistant seal. 4,702,500, Cl. 285-112.000.

Theisen, William M.; and Wiseman, Charles D., to BOC Group, Inc., The. Method of fabricating a freestanding semiconductor connection. 4,702,003, Cl. 29-840.000.

Theragenics Corporation: *See—*
Russell, John L., Jr.; and Coggins, David N., 4,702,228, Cl. 128-1.200.

Thermo Electron - Web Systems, Inc.: *See—*
Taylor, Bruce F.; and Hagen, Kenneth G., 4,702,015, Cl. 34-20.000.

Thielmann, Friedolin. Device for cleaning the gas nozzle of a welding torch. 4,702,195, Cl. 118-72.000.

Thilmony, James C. Compaction wheel. 4,702,643, Cl. 404-121.000.

Thomas, Allan: *See—*
Finkel, Henry; and Thomas, Allan, 4,702,378, Cl. 206-581.000.

Thomas & Betts Corporation: *See—*
Sadigh-Behzadi, Amir-Akbar, 4,702,706, Cl. 439-69.000.

Thompson, Ronald J., to Polysar Limited. Process for binding non-wovens with acrylate compounds. 4,702,944, Cl. 427-389.800.

Thomson, Allan R.; and Heath, Thomas V., to Thomson Welding & Inspection Ltd. Friction welding apparatus. 4,702,405, Cl. 228-2.000.

Thomson-CSF: *See—*
Frappe, Gerard; and Ortalli, Patrice, 4,703,250, Cl. 323-317.000.
Mesquida, Guy, 4,703,219, Cl. 313-111.000.
Pham, Ngu T., 4,703,204, Cl. 307-448.000.

Thomson Welding & Inspection Ltd.: *See—*
Thomson, Allan R.; and Heath, Thomas V., 4,702,405, Cl. 228-2.000.

Thorbecke, G. Jeanette; and Zucker, Marjorie. Composition containing platelet factor 4 and method for restoring suppressed immune responses. 4,702,908, Cl. 424-88.000.

Three Bond Co., Ltd.: *See—*
Miyauchi, Yukio; Nakagawa, Yuichi; Kurihara, Makoto; and Hayashi, Norifumi, 4,702,939, Cl. 42-195.000.

Thurman, Glenn A., to Colonial Rubber Works, Inc. Method of preparing a polymer for cross-link rotational molding and a polymer prepared by said method. 4,703,093, Cl. 525-387.000.

Thyzel, Reinhardt: *See—*
Schroder, Eckhard; and Thyzel, Reinhardt, 4,702,245, Cl. 128-303.100.

Tiede, Heige, to August Kuhne, Firma. Sailboat having at least two hulls. 4,702,186, Cl. 114-39.000.

Tieszen, Dale O.; and Dix, James S., to Phillips Petroleum Company. Mold corrosion inhibitors. 4,703,088, Cl. 525-189.000.

Timmons, Sheila: *See—*
Hawiger, Jack J.; Timmons, Sheila; and Kloczewiak, Marek, 4,703,039, Cl. 514-21.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Hirabayashi, Hideo; Endo, Masami; and Kokubo, Kakuro, 4,702,414, Cl. 239-4.000.

Tobacco Research and Development Institute Limited: *See—*
Strydom, Mauritz L., 4,702,263, Cl. 131-336.000.

Tobiasz, Andre , to Automotive Products plc. Vehicle brake pressure proportioning valve. 4,702,529, Cl. 303-9.620.

Todd, Mike J.: *See—*
Palmer, Gary E.; and Todd, Mike J., 4,701,976, Cl. 15-385.000.

Todt, Klaus H.: *See—*
Wieske, Theophil; Todt, Klaus H.; and Kleibeuker, Johan F., 4,702,928, Cl. 426-607.000.

Togie Corporation: *See—*
Mehmert, Larry B.; and Huegel, Irene, 4,702,828, Cl. 210-131.000.

Toku, Hisayuki: *See—*
Yoshikawa, Kiyoshi; Toku, Hisayuki; Ueda, Makoto; and Tamagaki, Hiroshi, 4,703,222, Cl. 313-362.100.

Tokuhara, Mitsuhiro: *See—*
Saito, Takashi; Nitanda, Hiroshi; Inuzuka, Tsuneki; Tokuhara, Mitsuhiro; and Honda, Haruhisa, 4,702,586, Cl. 355-3.00R.

Tokui, Akira: *See—*
Nakajima, Masayuki; Sato, Shinichi; Tokui, Akira; Kawai, Akira; Nagatomo, Masao; and Ozaki, Hiroji, 4,702,796, Cl. 156-653.000.

Tokui, Satoru: *See—*
Sueyoshi, Susumu; Tokui, Satoru; and Nanba, Keiichiro, 4,703,450, Cl. 364-900.000.

Tokumaru, Sennosuke; Kubo, Michinori; and Nogami, Mari, to Tokumaru, Sennosuke. Lyophilized kefir yoghurt health food. 4,702,923, Cl. 426-61.000.

Tokumasu, Noboru: *See—*
Maeda, Kazuo; Tokumasu, Noboru; and Fukuyama, Toshihiko, 4,702,936, Cl. 427-54.100.

Tokuoka, Hiroshi: *See—*
Fujioka, Yoshiki; and Tokuoka, Hiroshi, 4,703,262, Cl. 324-208.000.

Tokura, Norihito; Kawai, Hisasi; Goto, Masahiro; Morino, Seiji; and Soumiya, Masato, to Nippon Soken, Inc.; and Nippondenso Co., Ltd. Ignition device for an internal combustion engine. 4,702,221, Cl. 123-606.000.

Tokyo Keiki Company Ltd.: *See—*
Takeuchi, Kunihiko; and Morishige, Yuge, 4,703,244, Cl. 318-696.000.

Tokyo Kogaku Kikai Kabushiki Kaisha: *See—*
Yoshino, Hisakazu; Nishimura, Shinichi; and Takagi, Kazutoshi, 4,702,570, Cl. 350-516.000.

Tokyo Ohka Kogyo Co., Ltd.: *See—*
Ishii, Wataru; Miyazawa, Shozo; Tsuchiya, Shinji; Nakane, Hisashi; and Yokota, Akira, 4,702,992, Cl. 430-272.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Hashimoto, Hiroshi, 4,703,413, Cl. 364-147.000.

Toler, Charles E.: *See—*
Klug, Ralph W.; Toler, Charles E.; and Rylatt, John A., 4,702,878, Cl. 376-249.000.

Tomcik, Jame D.: *See—*
Adelmann, Harry W.; and Tomcik, Jame D., 4,703,477, Cl. 370-94.000.

Tomii, Kaoru; Miyama, Hiroshi; Kawauchi, Yoshikazu; and Nishida, Jun, to Matsushita Electric Industrial Co., Ltd. Flat type image display tube and display device using the same. 4,703,231, Cl. 315-366.000.

Tomii, Uzo: *See—*
Okui, Tokujiro, 4,702,788, Cl. 156-252.000.

Tomita, Masatoshi: *See—*
Kadono, Masaru; Nago, Kumio; Yamamoto, Tatsushi; Muramatsu, Tersuro; Tsuchimoto, Shuuhei; Yoshikawa, Mitsuhiko; and Tomita, Masatoshi, 4,702,935, Cl. 427-42.000.

Tomite, Toshio: *See—*
Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, 4,703,210, Cl. 310-154.000.

Tomlinson, Ronald S.: *See—*
Heffernan, Edward J.; and Tomlinson, Ronald S., 4,702,225, Cl. 126-116.00A.

Tomoda, Naohisa: *See—*
Sakauchi, Takashi; Mohri, Fumihiko; Tomoda, Naohisa; and Nakatsuka, Satoshi, 4,702,852, Cl. 252-62.540.

Tomono, Noboru: *See—*
Fujii, Kunihisa; Tomono, Noboru; Kito, Tetsuo; and Yoshino, Kosei, 4,703,295, Cl. 335-129.000.

Tomori nee Jozst, Eva: *See—*
Bajusz, Sandor; Szell nee Hasenohrl, Erzsbet; Bagdy, Daniel; Barabas, Eva; Dioszegi, Mariann; Fittler, Zsuzsa; Jozsa, Ferencz; Horvath, Gyula; and Tomori nee Jozst, Eva, 4,703,036, Cl. 514-18.000.

Tomy Kogyo Co. Inc.: *See—*
Konta, Yukio; and Yoneda, Yosuke, 4,702,720, Cl. 446-448.000.

Tooker, Keith R.: *See—*
Nussbaum, Theodore W.; Tooker, Keith R.; and Cox, Percy T., 4,703,278, Cl. 324-344.000.

Toray Industries, Inc.: *See—*
Hasegawa, Katsumi; Cano, Michio; Nagayasu, Tadahito; and Umeda, Kazuo, 4,702,871, Cl. 264-101.000.
Matsuura, Kazuo; Nakahara, Katuzi; and Hayashi, Kenji, 4,702,980, Cl. 430-63.000.

Torelli, Guido: *See—*
De La Plaza, Alejandro; and Torelli, Guido, 4,703,249, Cl. 323-316.000.

Tornblom, Bengt H., to Tornbloms Kvalitetskontroll AB. Method and apparatus for compensating for different depths of sun currents induced in the object tested for imperfections. 4,703,265, Cl. 324-232.000.

Tornbloms Kvalitetskontroll AB: *See—*
Tornblom, Bengt H., 4,703,265, Cl. 324-232.000.

Toshiba Battery Co., Ltd.: *See—*
Hiratsuka, Kazuya; Sato, Yuichi; Aoki, Yoshiyasu; Yui, Hiroshi; Miyabayashi, Mitsutaka; and Itsubo, Akira, 4,702,977, Cl. 429-194.000.

Toshiba Tungaloy Co., Ltd.: *See—*
Fukuhara, Mikio; and Mitsuda, Tetsuya, 4,702,769, Cl. 75-233.000.
Noh, Akihiko; Sato, Shinichi; Kakuda, Itsusuke; and Kanno, Shigeyuki, 4,701,994, Cl. 29-568.000.

TOTAL Compagnie Francaise des Petroles: *See—*
Lecoffre, Yves; and Woillez, Jacques, 4,702,837, Cl. 210-512.300.

Toto, Takayuki: *See—*
Rokksku, Tadashi; Houzouji, Akira; Omori, Shunji; and Toto, Takayuki, 4,702,652, Cl. 409-84.000.

Touda, Takayasu: *See—*
Mikita, Muneharu; Tanioku, Shozo; and Touda, Takayasu, 4,703,067, Cl. 521-63.000.

Tower, Stephen N.; and Schulz, Terry L., to Westinghouse Electric Corp. Nuclear reactor with passive safety system. 4,702,879, Cl. 376-282.000.

Toyo Construction Co., Ltd.: *See—*
Shiba, Toyoaki; Goto, Seiichi; and Ito, Keishi, 4,702,024, Cl. 37-67.000.

Toyoda Gosei Co., Ltd.: *See*—
Hirano, Atsuo; Hiramitsu, Tetsushi; and Ohno, Satoshi, 4,702,705, Cl. 439-15.000.
Ukai, Mikio; and Okumoto, Ryoji, 4,702,483, Cl. 277-212.0FB.

Toyoda, Kenichi: *See*—
Nakashima, Seiichiro; Toyoda, Kenichi; Inagaki, Shigemi; and Ito, Susumu, 4,702,665, Cl. 414-730.000.

Toyoshima, Isao: *See*—
Takahashi, Hiroyuki; and Toyoshima, Isao, 4,703,218, Cl. 310-348.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Iwao, Nomura; Masuyama, Takayuki; Tanigawa, Yasuo; and Hasimoto, Hirofumi, 4,702,666, Cl. 414-730.000.
Kato, Hisaaki; Yamaguchi, Shuuji; and Okazaki, Toshiharu, 4,702,515, Cl. 296-189.000.
Kouno, Katsumi; and Sawada, Daisaku, 4,702,725, Cl. 474-28.000.
Maeda, Yoshihiko; Nogami, Toshiaki; Kashiwagi, Shigeru; Sakurai, Kenji; and Nishiyama, Kunio, 4,702,517, Cl. 296-214.000.
Matsuno, Yutaka; Kumagai, Tadanobu; and Tanaka, Hatsuyuki, 4,701,982, Cl. 24-273.000.
Nakamura, Shinya; Kubo, Seitoku; and Taga, Yutaka, 4,702,083, Cl. 60-721.000.
Taga, Yutaka; Kubo, Seitoku; Kashihara, Yuji; Morisawa, Kunio; Takada, Mitsuru; and Nakamura, Yasunari, 4,702,341, Cl. 180-249.000.

Toyota Jidosha Kabushikikaisha: *See*—
Hirao, Kouji; Kuwana, Kazutaka; and Asami, Ken, 4,702,123, Cl. 74-526.000.

Toyota Kidosha Kabushiki Kaisha: *See*—
Saito, Taiji; and Kotani, Akira, 4,702,079, Cl. 60-599.000.

Toyota Shatai Kabushiki Kaisha: *See*—
Maeda, Yoshihiko; Nogami, Toshiaki; Kashiwagi, Shigeru; Sakurai, Kenji; and Nishiyama, Kunio, 4,702,517, Cl. 296-214.000.

Traitler, Helmut; and Winter, Heike, to Nestc S.A. Nutritive compositions containing fatty substances and a process for the preparation thereof. 4,703,060, Cl. 514-549.000.

Trauth, Hubert: *See*—
Helwig, Reinhard; Neumann, Peter; Aumueller, Alexander; and Trauth, Hubert, 4,703,072, Cl. 524-99.000.

Trautmann, Jean-Marie C.: *See*—
Hoffner, Daniel A. E.; and Trautmann, Jean-Marie C., 4,702,776, Cl. 106-309.000.

Tredwell, Gilman; Kraft, Kenneth N.; and Ampon, Felix A., to George Koch Sons, Inc. Conveyor system with selectively disengageable carts. 4,702,174, Cl. 104-172.200.

Trema, Daniel, to Elf France. Suspension device for a vehicle wheel support arm and front-rear coupling system for said suspension. 4,702,338, Cl. 180-219.000.

Triefenbach, Dieter: *See*—
Naoumidis, Aristides; Neumeister, Herbert; Schirbach, Arno; Struck, Bernd D.; and Triefenbach, Dieter, 4,702,784, Cl. 156-89.000.

Trieselt, Wolfgang: *See*—
Denzinger, Walter; Hartmann, Heinrich; Trieselt, Wolfgang; Kleber, Erhard; and Hettche, Albert, 4,702,858, Cl. 252-174.240.

Trimble, Donald E.: *See*—
Beckwith, Paul B.; Bistarkey, Donald S.; Pohedra, Joseph J.; and Trimble, Donald E., 4,702,698, Cl. 434-2.000.

Trombly, Barry R.: *See*—
Mattingly, William R.; and Trombly, Barry R., 4,702,537, Cl. 439-152.000.

Troupes, Demetrios; and Alexander, Randall W., to International Business Machines Corporation. Method and apparatus for displaying enhanced dot matrix characters. 4,703,323, Cl. 340-790.000.

Trudeau, Ronald E. Shotshell cartridge adapter. 4,702,170, Cl. 102-446.000.

Trutzschler GmbH & Co. KG: *See*—
Leifeld, Ferdinand, 4,701,981, Cl. 19-105.000.

TRW Inc.: *See*—
Blazek, William S., 4,702,298, Cl. 164-137.000.
Cage, Jerry L.; and Kulp, Jonathan B., 4,702,335, Cl. 180-142.000.

Tsai, Boh C.: *See*—
Farrell, Christopher J.; and Tsai, Boh C., 4,702,966, Cl. 428-500.000.

Tsai, John J.: *See*—
Solarek, Daniel B.; Jobe, Patrick G.; Tessler, Martin M.; Billmers, Robert L.; Lamb, Diane J.; and Tsai, John J., 4,703,116, Cl. 536-104.000.

Tsubouchi, Toshiyuki; Minokami, Tomiyasu; and Shimizu, Nobuaki, to Idemitsu Kosan Company Limited. Process for introduction of styrenes in side chain of substituted aromatic compounds. 4,703,124, Cl. 546-352.000.

Tsuchida, Makoto: *See*—
Odo, Satoshi; Iida, Tetsuo; Abe, Atsushi; and Tsuchida, Makoto, 4,702,201, Cl. 123-2.000.

Tsuchida, Tetsuo: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,702,339, Cl. 180-219.000.

Tsuchie, Kimihiro. Driving device for bicycle. 4,702,486, Cl. 280-255.000.

Tsuchimoto, Shuhei: *See*—
Kita, Ryusuke; Nishigaki, Satoshi; and Tsuchimoto, Shuhei, 4,701,997, Cl. 437-5.000.

Tsuchimoto, Shuuhei: *See*—
Kadono, Masaru; Nago, Kumio; Yamamoto, Tatsushi; Muramatsu, Tersuro; Tsuchimoto, Shuuhei; Yoshikawa, Mitsuhiko; and Tomita, Masatoshi, 4,702,935, Cl. 427-42.000.

Tsuchiya, Shinji: *See*—
Ishii, Wataru; Miyazawa, Shozo; Tsuchiya, Shinji; Nakane, Hisashi; and Yokota, Akira, 4,702,992, Cl. 430-272.000.

Tsuda, Hiroshi: *See*—
Kasai, Junichi; Imai, Hiroshi; and Tsuda, Hiroshi, 4,703,502, Cl. 381-24.000.

Tsuda, Koji: *See*—
Suzuki, Shinichi; Hara, Masato; Tsuda, Koji; Takasugi, Eiji; Kinba, Toshifumi; and Kaneko, Atsumi, 4,702,008, Cl. 33-1.00T.

Tsuda, Tadayuki; and Kurematsu, Katsumi, to Canon Kabushiki Kaisha. Cleaning device for an image forming apparatus. 4,702,591, Cl. 355-15.000.

Tsudakoma Corp.: *See*—
Sugita, Katsuhiko, 4,702,285, Cl. 139-452.000.

Tsukamoto, Goro: *See*—
Ohtaka, Hiroshi; Kanazawa, Toshiro; Ito, Keizo; and Tsukamoto, Goro, 4,703,048, Cl. 514-255.000.

Tsukamoto, Katsuhiro: *See*—
Shimano, Hiroki; Shimizu, Masahiro; Tsukamoto, Katsuhiro; and Inuishi, Masahide, 4,702,797, Cl. 156-653.000.

Tsuno, Katsuhiko: *See*—
Okumura, Eisuke; and Tsuno, Katsuhiko, 4,703,167, Cl. 250-203.00R.

Tsuruno, Masayoshi; and Horie, Michihiko, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha; and Ishikawajima Plant Engineering Kabushiki Kaisha. Apparatus for cooling high-temperature particles. 4,702,019, Cl. 34-168.000.

Tsutani, Sadahiro: *See*—
Hagihara, Siro; Tsutani, Sadahiro; and Maeda, Yoichiro, 4,702,331, Cl. 180-9.320.

Tsutsumi, Sunsaku; and Ozawa, Takurou, to Kokusan Kinzoku Kogyo Kabushiki Kaisha. Lock actuator for a pair of locks. 4,702,117, Cl. 74-89.170.

Tsuyoshi, Toshiaki: *See*—
Yonezawa, Seiji; Kanazawa, Yasunori; and Tsuyoshi, Toshiaki, 4,703,408, Cl. 369-44.000.

Tucker, Charles L.: *See*—
Wheeler, Gilbert A.; Church, Gregg A.; Tucker, Charles L.; and Ward, William R., 4,702,687, Cl. 425-227.000.

Tukude, Noboru, to Asahi Glass Company Ltd. Electrochromic display device. 4,702,566, Cl. 350-357.000.

Tuliu, Marioara: *See*—
Stoian, Anatol; Panaitescu, Nicolita; and Tuliu, Marioara, 4,702,487, Cl. 208-390.000.

Tully, Wilfred R.: *See*—
Gillespie, Roger J.; and Tully, Wilfred R., 4,703,049, Cl. 514-258.000.

Tuot, James, to Nestec S.A. Dryer and drying method. 4,702,799, Cl. 159-48.100.

Turbo Coils Inc.: *See*—
Nunn, John O., Sr.; and Nunn, John O., Jr., 4,702,086, Cl. 62-113.000.

Turner, James K., to Gaston County Dyeing Machine Company. Apparatus for wet processing a continuous traveling web of material. 4,702,092, Cl. 68-53.000.

Turner, Terry A. Door with raised panels. 4,702,054, Cl. 52-311.000.

Tweco Products, Inc.: *See*—
Cusick, Joseph B., III; and Raney, Ty A., 4,702,539, Cl. 439-588.000.

Twin City Surgical, Inc.: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.

Tzora Furniture Industries Ltd.: *See*—
Lapid, Aharon M., 4,702,719, Cl. 446-227.000.

U-Seal-It Vending Co., Inc.: *See*—
Rachman, Isadore B., 4,702,392, Cl. 221-151.000.

UBE Industries, Ltd.: *See*—
Yamamoto, Shinji; Kaijiri, Kouhei; Nagakura, Kouichi; Oda, Denichi; Matsumori, Yasuo; and Nakayama, Kimio, 4,703,086, Cl. 525-133.000.

Uchida, Minoru: *See*—
Takeda, Takao; Yamazaki, Hitoshi; Taniguchi, Yoshiteru; Tanaka, Norihiko; Ito, Hiroshi; Uchida, Minoru; and Imai, Jun, 4,703,227, Cl. 313-634.000.

Uchiyama, Kazuo: *See*—
Ohmi, Masatoshi; Yoneda, Toshihiko; and Uchiyama, Kazuo, 4,702,203, Cl. 123-52.0MV.

Ueda, Ikuo; Kobayashi, Masakazu; and Kitaguchi, Tadashi, to Fujisawa Pharmaceutical Co., Ltd. Cephem compounds and processes for preparation thereof. 4,703,046, Cl. 514-202.000.

Ueda, Kazuya: *See*—
Nakayama, Nobuo; Nagamine, Kenzi; Ueda, Kazuya; and Saito, Fuminari, 4,703,186, Cl. 250-566.000.

Ueda, Makoto: *See*—
Yoshikawa, Kiyoshi; Toku, Hisayuki; Ueda, Makoto; and Tamagaki, Hiroshi, 4,703,222, Cl. 313-362.100.

Ueda, Motohiko: *See*—
Adachi, Ikuo; Hiramatsu, Yoshiharu; Ueda, Motohiko; and Kawakami, Masaru, 4,703,051, Cl. 514-291.000.

Ueda, Tsunesuke, to Q.P. Corporation. Method for preparing fish-egg-like edible products. 4,702,921, Cl. 426-48.000.
Uematsu, Tadayuki, to Furukawa Electric Co., Ltd. Water impervious rubber or plastic insulated power cable. 4,703,134, Cl. 174-106.0SC.
Ueno, Takashi; Abo, Toshimi; and Miyamura, Katsunori, to Nissan Motor Co., Ltd. Method and apparatus of controlling supercharging pressure in a turbocharger. 4,702,080, Cl. 60-602.000.
Ueoka, Joe: *See*—
Katou, Yoshiaki; Ueoka, Joe; and Yoshida, Satoshi, 4,703,383, Cl. 360-126.000.
Uhrich, Daniel T.: *See*—
Beckey, Thomas J.; Kallas, Kerry M.; and Uhrich, Daniel T., 4,702,413, Cl. 236-46.00R.
Ukai, Mikio; and Okumoto, Ryoji, to Toyoda Gosei Co., Ltd. Mechanical shaft joint boot. 4,702,483, Cl. 277-212.0FB.
Ulveing, Leon; Linden, Joseph; Bohnet, Matthias; Wies, Georges; and Mack, Raymond, to Paul Wurth S.A. Process and apparatus for the injection by pneumatic means of metered amounts of pulverulent materials into a vessel which is under variable pressure. 4,702,182, Cl. 110-347.000.
Ulveling, Leon; Schmit, Louis; and Legille, Edouard, to Paul Wurth S.A. Apparatus for the pneumatic injection of pulverulent materials into a pressurized vessel, and its application to the injection of powered coal into a shaft furnace. 4,702,288, Cl. 141-67.000.
Umbricht, Stefan, to BBC Brown, Boveri & Company, Limited. Voltage converter with GTO thyristors in series connection with at least a choke with freewheeling circuit. 4,703,411, Cl. 363-57.000.
Umeda, Kazuo: *See*—
Hasegawa, Katsumi; Ohno, Michio; Nagayasu, Tadahito; and Umeda, Kazuo, 4,702,871, Cl. 264-101.000.
Umeda, Tadashi: *See*—
Kato, Akira; Igarashi, Hisashi; and Umeda, Tadashi, 4,702,211, Cl. 123-421.000.
Umehara, Shoji: *See*—
Matsumoto, Masakazu; Takiguchi, Takao; Yamashita, Masataka; Umehara, Shoji; and Ishikawa, Shozo, 4,702,982, Cl. 430-72.000.
Umezu, Mitsuo, to Sony Corporation. Loudspeaker terminal strip. 4,703,508, Cl. 381-188.000.
Umino, Shigeru; Yamato, Koji; Kimura, Hajime; and Ichida, Toshio, to Kawasaki Steel Corporation. Method for making high corrosion resistance composite plated steel strip. 4,702,802, Cl. 204-28.000.
Unangst, Paul C.: *See*—
Connor, David T.; Cetenko, Wiaczeslaw A.; Unangst, Paul C.; and Johnson, Elizabeth A., 4,703,053, Cl. 514-382.000.
Uncommon Conglomerates, Inc.: *See*—
Mason, William H., III, 4,702,783, Cl. 156-64.000.
Uni-Pak Film Systems, Inc.: *See*—
Reid, Laurie M., 4,702,060, Cl. 53-69.000.
Union Camp Corporation: *See*—
Locko, George A.; and Frihart, Charles R., 4,703,070, Cl. 523-102.000.
Union Carbide Corporation: *See*—
Dombek, Bernard D., 4,703,064, Cl. 518-700.000.
Godlewski, Robert E., 4,703,082, Cl. 524-731.000.
Grover, Bhadra S., 4,702,898, Cl. 423-220.000.
Union Oil Company of California: *See*—
Johnson, Clyde R.; Hawryluk, Raymond; and Katrencik, Gerald, 4,702,694, Cl. 432-133.000.
United Kingdom Atomic Energy Authority: *See*—
Clayton, Colin G.; and Spackman, Ramon, 4,702,379, Cl. 209-539.000.
United States of America
Agriculture: *See*—
Setterholm, Vance C.; and Hunt, John F., 4,702,870, Cl. 264-87.000.
Air Force: *See*—
Brothers, Jack, 4,702,504, Cl. 292-66.000.
Levy, Robert S.; and Kerr, Thomas W., 4,702,438, Cl. 244-104.0FP.
Army: *See*—
Deutermann, Alan R.; and Bodson, Charles D., 4,703,362, Cl. 358-263.000.
Energy: *See*—
Benson, David K.; and Burrows, Richard W., 4,702,853, Cl. 252-70.000.
Kolbe, William F.; and Leskovar, Branko, 4,703,273, Cl. 324-314.000.
Shalek, Peter D., 4,702,901, Cl. 423-346.000.
Health and Human Services: *See*—
Merril, Carl R., 4,703,016, Cl. 436-86.000.
National Aeronautics and Space Administration: *See*—
Blair, Winford, 4,703,159, Cl. 219-78.120.
Gennery, Donald B., 4,703,513, Cl. 382-27.000.
Navy: *See*—
Breglia, Denis R., 4,702,575, Cl. 351-210.000.
Goldstein, David, 4,702,884, Cl. 419-8.000.
Kelley, Anthony D.; Finley, James W.; Eachus, Vernon F.; Lim, Richard A.; and Yano, Miles K., 4,702,439, Cl. 244-158.00A.
Richardson, Steven D., 4,702,322, Cl. 169-28.000.
U.S. Philips Corporation: *See*—
Barbu, Stefan, 4,703,284, Cl. 330-259.000.
Beckmann, Friedrich K.; Dotsch, Horst; and Hoppe, Wolfgang, 4,702,557, Cl. 350-330.000.
Bierhoff, Waltherus C. J., 4,703,346, Cl. 358-75.000.
Heuts, Jacobus J. F. G.; and Frens, Gerrit, 4,702,978, Cl. 429-218.000.
Janssen, Johannes H. H., 4,703,236, Cl. 318-254.000.
Nicolas, Jean-Marie; and Pesque, Patrick, 4,702,258, Cl. 128-660.000.
Nieuwendijk, Joris A. M.; Heijnemans, Werner A. L.; Sluijterman, Albertus A. S.; and Vink, Nicolaas G., 4,703,232, Cl. 315-370.000.
van de Plassche, Rudy J., 4,703,310, Cl. 340-347.0DA.
White, Philip D., 4,703,324, Cl. 340-825.140.
United Technologies Corporation: *See*—
Chin, Herbert A., 4,702,782, Cl. 148-429.000.
DiValentin, Eugene D.; and Healy, Henry S., 4,703,189, Cl. 290-44.000.
Fournier, Joseph T., Jr.; and Swarts, Richard E., 4,703,287, Cl. 332-7.510.
Nighan, William L.; and Otter, Fred A., Jr., 4,703,229, Cl. 315-169.400.
Wisner, George R., 4,703,235, Cl. 318-254.000.
Univ. of Minnesota, Regents of the: *See*—
Amundsen, Louis R.; Patterson, Robert P.; Baxter, Tanya L.; Scudder, Glenn N.; Duescher, Wayne O.; Dahlman, Willis E.; Schukar, Gary W.; and Steinback, Clarence I., 4,702,108, Cl. 73-379.000.
University of British Columbia, The: *See*—
Hall, Laurance D.; and Norwood, Timothy J., 4,703,270, Cl. 324-309.000.
University of California, The Regents of the: *See*—
Arakawa, Mitsuaki, 4,703,272, Cl. 324-311.000.
Kaufman, Leon; Carlson, Joseph W.; Arakawa, Mitsuaki; McCarten, Barry M.; and Fehn, John H., 4,703,274, Cl. 324-318.000.
University of Florida: *See*—
Gravenstein, Joachim S.; and Lampotang, Samsun, 4,702,241, Cl. 128-204.250.
University of Medicine & Dentistry of New Jersey: *See*—
Silver, Frederick A.; Berg, Richard A.; Birk, David E.; Weadock, Kevin; and Whyne, Conrad, 4,703,108, Cl. 530-356.000.
University of Oklahoma, The Board of Regents for the: *See*—
Yunker, Stanley B.; and Radovich, John M., 4,703,010, Cl. 435-173.000.
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Upat GmbH & Co.: *See*—
Frischmann, Albert; Rieger, Johannes; Mermi, Kurt; Kistner, Herbert; and Zimmermann, E. Harald, 4,702,654, Cl. 411-31.000.
Uralskaya, Silvia L.: *See*—
Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.
Uranium Pechiney: *See*—
Personnet, Pierre-Bernard; and Philbert, Jean-Michel, 4,702,820, Cl. 208-424.000.
Urihara, Kazuhiro: *See*—
Kojo, Hidehiko; Akimoto, Koji; and Urihara, Kazuhiro, 4,702,962, Cl. 428-418.000.
Usami, Akihiro, to Canon Kabushiki Kaisha. Image density control apparatus. 4,702,590, Cl. 355-14.00C.
Ushimaru, Koichi; Nakamichi, Koichi; and Saito, Hitoshi, to Nippon Shinyaku Co. Ltd. Pharmaceutical preparations and a method of manufacturing them. 4,702,918, Cl. 424-461.000.
Vachhani, Vasantrai A.; and Bodimer, Gilbert D., to Magnetic Controls Company. Electrical connector. 4,702,544, Cl. 439-395.000.
Vaige, Moshe: *See*—
Berliner, Shlomo; Vered, Areyh; Shmuel, Reich; and Vaige, Moshe, 4,703,259, Cl. 324-95.000.
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DeVaul, Richard L.; and Vaikness, Gerald P., 4,702,029, Cl. 42-94.000.
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Pontiff, Thomas M.; and Collins, Frederick H., 4,702,868, Cl. 264-50.000.
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Rivier, Jean E. F.; Spiess, Joachim; and Vale, Wylie W., Jr., 4,703,035, Cl. 514-12.000.
Valenta, Harry L., Jr.: *See*—
Nappholz, Tibor A.; Lubin, Mark; and Valenta, Harry L., Jr., 4,702,253, Cl. 128-419.0PG.
Valint, Paul L.: *See*—
Bock, Jan; Valint, Paul L.; and Pace, Salvatore J., 4,702,319, Cl. 166-275.000.
Vance, Gary C.: *See*—
Bender, Herman G.; Shipley, Fred J.; and Vance, Gary C., 4,703,372, Cl. 360-96.100.
VanDenburgh, Ronald J.: *See*—
Hansen, Kurt L.; and VanDenburgh, Ronald J., 4,702,673, Cl. 416-215.000.
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Lambrecht, Emiel Y.; and Van Der Gucht, William, 4,702,731, Cl. 493-196.000.
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Van Duyn, Paul D.; and Geddie, John D., to General Motors Corporation. Vehicle headlamp assembly. 4,703,399, Cl. 362-66.000.
Van Klompenburg, Marlo, to Rolscreen Company. Field installable rolling screen assembly. 4,702,297, Cl. 160-271.000.
Vannucci, Giovanni: *See*—
Foschini, Gerard J.; and Vannucci, Giovanni, 4,703,474, Cl. 370-18.000.
Van Zee, Daryl W.: *See*—
Newendorp, Vincent W.; and Van Zee, Daryl W., 4,702,066, Cl. 56-341.000.
Varshney, Ramesh C., to Inova Microelectronics Corporation. Wafer level integration technique. 4,703,436, Cl. 364-490.000.
Vasilieva, Natalia V.: *See*—
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Vater, George R., to J. I. Case Company. Drive shaft shield assembly. 4,702,724, Cl. 464-172.000.
Vatter, Waldemar; and Exner, Franz, to ITT Industries, Inc. Hydraulic braking and steering brake system. 4,702,330, Cl. 180-6.200.
VDO Adolf Schindling AG: *See*—
Sausner, Andreas; and Volz, Peter, 4,702,209, Cl. 123-339.000.
Veith, Richard: *See*—
Zibis, Peter; and Veith, Richard, 4,703,290, Cl. 333-195.000.
Velev, Velyo T.: *See*—
Bakalov, Nikolay G.; Penev, Penyo I.; Ivanov, Ivan K.; Velev, Velyo T.; Savov, Peter H.; and Vulchev, Alexander Y., 4,703,493, Cl. 373-95.000.
Venetianer, Pal: *See*—
Boros, Imre; Venetianer, Pal; and Posfai, Gyorgy, 4,703,012, Cl. 435-320.000.
Vered, Areyh: *See*—
Berliner, Shlomo; Vered, Areyh; Shmuel, Reich; and Vaige, Moshe, 4,703,259, Cl. 324-95.000.
Veriflo Corporation: *See*—
Ollivier, Louis A., 4,702,277, Cl. 137-613.000.
Vermeer Manufacturing Company: *See*—
Newendorp, Vincent W.; and Van Zee, Daryl W., 4,702,066, Cl. 56-341.000.
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Boehmer, Dennis A.; and Piper, Dale R., 4,702,386, Cl. 220-86.00R.
Lebold, John R., 4,702,215, Cl. 123-514.000.
Verrico, Marsha K., to Nabisco Brands, Inc. Method and apparatus for spraying snow-like frosting onto food stuff particles. 4,702,925, Cl. 426-96.000.
Vescio, Donald W.; and Latham, Daniel S., to R. E. Dietz Co. Shock resistant vehicular lamp. 4,703,400, Cl. 362-80.000.
Vetco Gray Inc: *See*—
Brammer, Norman, 4,702,481, Cl. 277-116.200.
Vianini Industria S.p.A.: *See*—
Marchesi, Sergio; and Fachin, Gino, 4,702,282, Cl. 138-176.000.
Victaulic Company of America: *See*—
deRaymond, Peter G.; and Rung, Robert, 4,702,499, Cl. 285-112.000.
McLennan, William R., 4,702,501, Cl. 285-197.000.
Thau, Lawrence W., Jr.; and Dole, Douglas R., 4,702,500, Cl. 285-112.000.
Victor Company of Japan, Ltd.: *See*—
Inoue, Osamu; and Ohbayashi, Akira, 4,703,370, Cl. 360-10.200.
Sakamoto, Atsushi; and Iwahara, Makoto, 4,703,506, Cl. 381-92.000.
Shibata, Norio, 4,703,381, Cl. 360-123.000.
Victoria University of Manchester, The: *See*—
Coles, Harry J.; and Simon, Richard, 4,702,558, Cl. 350-330.000.
Viertel, Lothar: *See*—
Ebert, Charles; Delcroix, Jean L.; Majchrzak, Roland; and Viertel, Lothar, 4,702,513, Cl. 296-97.00H.
Vieth, Michael, to Siemens Aktiengesellschaft. Arrangement for the production of X-ray pictures by computer radiography. 4,703,177, Cl. 250-327.200.
Villarejos, Victor M.; and Visona, Kirsten A., to Louisiana State University A & M. Non-A, non-B hepatitis antigen, antigen compositions, vaccine and diagnostic reagent. 4,702,909, Cl. 424-89.000.
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Nieuwendijk, Joris A. M.; Heijnemans, Werner A. L.; Sluijterman, Albertus A. S.; and Vink, Nicolaas G., 4,703,232, Cl. 315-370.000.
Vinko, Mucic, to TCH Thermo-Consulting-Heidelberg GmbH. Combined steam and gas turbine plant. 4,702,081, Cl. 60-655.000.
Viola, Frank J., to Parker Hannifin Corporation. In-line hydrometer. 4,702,109, Cl. 73-440.000.
Visona, Kirsten A.: *See*—
Villarejos, Victor M.; and Visona, Kirsten A., 4,702,909, Cl. 424-89.000.
Vitro-Tec Fideicomiso: *See*—
Garcia de Leon, Jose L., 4,702,760, Cl. 65-30.140.
Vittorelli, Vittore, to Ing. C. Olivetti & C., S.p.A. Method and apparatus for the phonetic recognition of words. 4,703,504, Cl. 381-51.000.
Vodian, Morton A.; and Bean, Eric S., to Synbiotics, Corporation. Immunoassay for the detection of serum analytes using pH dependent chastropic acids. 4,703,001, Cl. 435-5.000.
Volkmann, Robert A., to Pfizer Inc. Hypoglycemic thiazolidinediones. 4,703,052, Cl. 514-337.000.
Volkov, Nikolai S.: *See*—
Kinderov, Petr A.; Volkov, Nikolai S.; Vasilieva, Natalia V.; and Malashkina, Regina T., 4,702,860, Cl. 252-511.000.
Volz, Peter: *See*—
Sausner, Andreas; and Volz, Peter, 4,702,209, Cl. 123-339.000.
Von Roll AG: *See*—
Kunnecke, Walter; Amacher, Urs; and Meier, Max, 4,703,150, Cl. 219-535.000.
von Ballmoos, Fritz, to Dr. von Ballmoos AG. Automatic cash-collecting monitoring installation. 4,703,164, Cl. 235-384.000.
von Gruenber, Hubertus: *See*—
Kircher, Dieter; von Gruenber, Hubertus; and Blum, Klaus D., 4,702,531, Cl. 303-114.000.
Von Holdt, John W. Mold pin lock. 4,702,456, Cl. 249-165.000.
von Koch, Arwed, to Daimler-Benz Aktiengesellschaft. Coupling between at least two members to be subjected to high thermal stress. 4,702,503, Cl. 285-330.000.
Vortran Corporation: *See*—
Hughes, Nathaniel, 4,702,415, Cl. 239-8.000.
Vsesojuzny Nauchnoissledovatelsky Institut Legkogo I Tekstilnogo Mashinostroenia: *See*—
Maximov, Gennady K.; Brusnikin, Arkady F.; Belonosov, Vladimir I.; Popova, Roza A.; Fux, Vladimir S.; Kagan, Vladimir M.; Uralskaya, Silvia L.; and Orlova, Nadezhda P., 4,702,069, Cl. 57-417.000.
Vulchev, Alexander Y.: *See*—
Bakalov, Nikolay G.; Penev, Penyo I.; Ivanov, Ivan K.; Velev, Velyo T.; Savov, Peter H.; and Vulchev, Alexander Y., 4,703,493, Cl. 373-95.000.
W. R. Grace & Co.: *See*—
Rendulic, Francis J.; Robinson, Randolph H.; and Maccini, John A., 4,702,994, Cl. 430-306.000.
W. Schlafhorst & Co.: *See*—
Raasch, Hans, 4,702,427, Cl. 242-35.50A.
WABCO Westinghouse Fahrzeugbremsen GmbH: *See*—
Ruhnau, Gerhard, 4,703,388, Cl. 361-91.000.
Wada, Hiroaki: *See*—
Kurachi, Yasuo; Arai, Katsuhiko; Wada, Hiroaki; Watabe, Yoji; and Irako, Sanae, 4,702,900, Cl. 423-345.000.
Waechter, Thomas R : *See*—
Davidson, Delma; and Waechter, Thomas R., 4,702,137, Cl. 83-718.000.
Wagner, Daniel B.: *See*—
Campbell, Robert L.; Wagner, Daniel B.; and O'Connell, James P., 4,703,017, Cl. 436-501.000.
Wagner, James L.: *See*—
Hensel, Robert J.; Wagner, James L.; Hundertmark, James M.; Sheridan, Stephen E.; and Heidel, David W., 4,702,202, Cl. 123-52.00M.
Wagner, Thomas J.: *See*—
Owens, Thomas M.; Wagner, Thomas J.; and Mrazek, William C., Jr., 4,702,924, Cl. 426-92.000.
Wagner, Wolfram: *See*—
Backer, Wolfgang; Wagner, Wolfram; Hahn, Gunther; and Miessen, Ralf, 4,701,980, Cl. 19-0.480.
Wakabayashi, Kouji: *See*—
Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, 4,702,968, Cl. 428-623.000.
Wakabayashi, Takeshi: *See*—
Kamei, Takao; Ono, Fuminobu; Komai, Keiichi; Wakabayashi, Takeshi; Ogawa, Takayuki; Ito, Hideaki; and Shirakawa, Kiyoshi, 4,702,745, Cl. 44-10.00D.
Walker, David L.: *See*—
Auld, Frederick H., Jr.; and Walker, David L., 4,703,354, Cl. 358-148.000.
Walker, Gary M.: *See*—
Ghorbani, Ali; and Walker, Gary M., 4,702,712, Cl. 439-596.000.
Walker, Stephen S.: *See*—
Seiler, Norman C.; and Walker, Stephen S., 4,703,505, Cl. 381-51.000.
Wallner, Josef, to Elastogran Maschinenbau GmbH. Mixing head for mixing two or more plastics components which react to form foam, in particular polyurethane. 4,702,890, Cl. 422-133.000.
Wallow, Peter; Gersbach, Klaus; Simon, Walter; Bisping, Bernhard; Montier, Patrick; and Moreau, Pierre A., to Rheinmetall GmbH; and Etat Francais represente par le Deleuge General pour l'armement. Sabot arrangement for a sub-caliber projectile. 4,702,172, Cl. 102-521.000.
Walsh, Peter J., to Duro-Test Corporation. Incandescent lamp with extended filament lifetime. 4,703,220, Cl. 313-112.000.
Walton, Alan G. Bioactive compositions affecting human skin tissue. 4,702,912, Cl. 424-95.000.
Wang, Ko Pen. Flexible bronchoscopic needle assembly. 4,702,260, Cl. 128-753.000.
Wang Laboratories, Inc.: *See*—
Haggerty, William T., 4,703,318, Cl. 346-723.000.
Wang, Timothy, to Boeing Company, The. Aircraft wing stall control device and method. 4,702,441, Cl. 244-204.000.
Wanuga, Stephen: *See*—
Fitelson, Michael M.; Wanuga, Stephen; and Williams, Jack B., 4,703,471, Cl. 370-1.000.

Ward, Luther S.: *See*—
Dittman, William J.; and Ward, Luther S., 4,702,710, Cl. 439-271.000.
Ward, William R.: *See*—
Wheeler, Gilbert A.; Church, Gregg A.; Tucker, Charles L.; and Ward, William R., 4,702,687, Cl. 425-227.000.
Wareham, William, to Dynisco, Inc. Pressure transducer. 4,702,113, Cl. 73-706.000.
Warmath, John G. Clothes clip for a hanger. 4,701,983, Cl. 24-511.000.
Warner-Lambert Company: *See*—
Connor, David T.; Cetenko, Wiaczeslaw A.; Unangst, Paul C.; and Johnson, Elizabeth A., 4,703,053, Cl. 514-382.000.
Geria, Navin, 4,702,916, Cl. 424-400.000.
Warner, Mark E.: *See*—
Mutschler, Carl E.; and Warner, Mark E., 4,702,595, Cl. 356-39.000.
Wasco Products, Inc.: *See*—
Sampson, Robert; and Flanigan, Sean, 4,702,049, Cl. 52-200.000.
Washington Research Foundation: *See*—
Pyzik, Aleksander J.; and Aksay, Ilhan A., 4,702,770, Cl. 75-236.000.
Washington State University Research Foundation: *See*—
Ratzlaff, Marc H.; Frame, John M.; and Grant, Barrie D., 4,703,217, Cl. 310-338.000.
Watabe, Yoji: *See*—
Kurachi, Yasuo; Arai, Katsuhiko; Wada, Hiroaki; Watabe, Yoji; and Irako, Sanae, 4,702,900, Cl. 423-345.000.
Watanabe, Hitoshi, to Nippon Thompson Co., Ltd. Roller retaining assembly. 4,702,628, Cl. 384-580.000.
Watanabe, Junji, to Kabushiki Kaisha Toshiba. Thermal ribbon cassette and housing therefore. 4,702,631, Cl. 400-208.000.
Watanabe, Okosu: *See*—
Tanaka, Masao; Watanabe, Okosu; and Inada, Koichi, 4,702,548, Cl. 350-96.150.
Watanabe, Shoji: *See*—
Sagami, Yosuke; Yamamoto, Akira; Watanabe, Shoji; Isobe, Tomohisa; and Funato, Susumu, 4,703,338, Cl. 357-72.000.
Watanabe, Shuichi: *See*—
Ichihara, Takeo; Watanabe, Shuichi; Futami, Takashi; and Oda, Nobutaka, 4,703,401, Cl. 362-80.000.
Watanabe, Youji: *See*—
Sako, Shizuka; Amaike, Kanetoshi; and Watanabe, Youji, 4,703,431, Cl. 364-470.000.
Wataya, Seiji, to Mitsubishi Denki Kabushiki Kaisha. Fuel injection control system for internal combustion engine. 4,702,214, Cl. 123-488.000.
Watzman, Barry A.: *See*—
Krause, Charles A.; Rajaram, Babu; and Watzman, Barry A., 4,703,419, Cl. 364-200.000.
Weadock, Kevin: *See*—
Silver, Frederick A.; Berg, Richard A.; Birk, David E.; Weadock, Kevin; and Whyne, Conrad, 4,703,108, Cl. 530-356.000.
Webasto-Werk W. Baier GmbH & Co.: *See*—
Paerisch, Jochen; Herlemann, Werner; Sweigart, Gerhard; Jardin, Hans; and Lutz, Alfons, 4,702,518, Cl. 296-217.000.
Webb, Johannes A. V. Chemical compositions comprising (1) methyl methacrylate polymer (2) P.E. wax (3) fast-evaporating solvent and (4) slow-evaporating solvent. 4,703,077, Cl. 524-462.000.
Weber, Christian: *See*—
Rasshofer, Werner; Paul, Reiner; Seel, Klaus; and Weber, Christian, 4,703,100, Cl. 528-66.000.
Weber, Georg: *See*—
Scheuble, Bernhard; Eidenschink, Rudolf; and Weber, Georg, 4,702,562, Cl. 350-350.00R.
Weber, Gephard; and Schrader, Karlheinz. D-glucuronic acid-urea condensate preparation for smoothing human skin. 4,703,041, Cl. 514-23.000.
Weddington, Willard T. Combination heated hair and beard comb. 4,702,265, Cl. 132-118.000.
Wehinger, Egbert; and Meyer, Horst, to Bayer Aktiengesellschaft. Intermediates of optically active 1,4-dihydropyridines. 4,703,119, Cl. 540-544.000.
Weigand, Artur: *See*—
Konig, Gerhard; Fleck, Karl; Kess, Herbert; and Weigand, Artur, 4,701,974, Cl. 15-323.000.
Weigel, Peter: *See*—
Holland-Letz, Guenter; Jaeger, Waldemar; Tewes, Udo; and Weigel, Peter, 4,703,162, Cl. 235-379.000.
Weigert, Dedo, to Dedo Weigert Film GmbH. Film transport device. 4,702,577, Cl. 352-191.000.
Weiland, Lynne E.; and Parks, Beryl H., to Westinghouse Electric Corp. Nuclear reactor spacer grid. 4,702,881, Cl. 376-442.000.
Weiland, Richard H.; and Franklin, William L., to Boeing Company, The. Aircraft trailing edge flap apparatus. 4,702,442, Cl. 244-216.000.
Weinberg, Norman L.: *See*—
Mazur, Duane J.; and Weinberg, Norman L., 4,702,804, Cl. 204-73.00R.
Weiner, Jerome; and Choung, Moon, to Cooper Industries. Lifting clamp cam wear indicator and method. 4,702,508, Cl. 294-101.000.
Weinhold, Helmut: *See*—
Bauer, Ludwig; Schneider, Erwin; Rensch, Walter; and Weinhold, Helmut, 4,702,464, Cl. 269-55.000.
Weirich, Walter: *See*—
Kussel, Willy; Dettmers, Michael; and Weirich, Walter, 4,702,148, Cl. 91-527.000.
Weiser, Sylvan W. Screw threaded closure with elastomeric grip band. 4,702,384, Cl. 215-295.000.
Weissenborn, Bernd: *See*—
Buchmuller, Reino; and Weissenborn, Bernd, 4,702,553, Cl. 350-96.290.
Wellnitz, Keith M.: *See*—
Fay, Gary; Mansmann, Jeffrey G.; and Wellnitz, Keith M., 4,703,390, Cl. 361-101.000.
Welsh, James N., to Shirco Infrared Systems, Inc. Emergency exhaust system for hazardous waste incinerator. 4,702,178, Cl. 110-193.000.
Wender, Harry, to Filtromatic Corp. Tamper proof package. 4,702,383, Cl. 215-232.000.
Wendorff, James A.: *See*—
Bunkoczy, Bela; Wendorff, James A.; and Battin, Walt W., 4,702,969, Cl. 428-635.000.
Wenz, Friedrich, to Hofmann Werkstatt-Technik GmbH. Method of quality grading in uniformity tests of rotors, in particular of automobile tires. 4,702,103, Cl. 73-146.000.
Wenzel, Robert J., to Frymaster Corporation, The. Portable filter. 4,702,827, Cl. 210-117.000.
Wenzl, Josef: *See*—
Ding, Kurt; Brandt, Helmut; and Wenzl, Josef, 4,703,326, Cl. 340-870.160.
West Electric Co., Ltd.: *See*—
Yoshino, Tsunemi; Ishikawa, Katsuji; and Mitsui, Hajime, 4,702,583, Cl. 354-400.000.
West, Paul R.: *See*—
Griffing, Bruce F.; and West, Paul R., 4,702,996, Cl. 430-325.000.
West, William P., to GA Technologies Inc. Apparatus and method for providing a modulated electron beam. 4,703,228, Cl. 315-149.000.
Westall, Frederick A.; Lee, Dominic S.; Cameron, Ian R.; and McLintock, Robert W., to British Telecommunications plc. Digital audio transmission. 4,703,480, Cl. 370-111.000.
Westfalia Separator AG: *See*—
Icking, Friedrich; and Bucker, Heinrich, 4,702,197, Cl. 119-14.180.
Westfall, Alan P.; and Roe, Robert J., to Canadian Patents and Development Limited. Liquid driven pump or propulsive apparatus. 4,702,676, Cl. 417-87.000.
Westinghouse Electric Corp.: *See*—
Isenberg, Arnold O., 4,702,971, Cl. 429-31.000.
Klug, Ralph W.; Toler, Charles E.; and Rylatt, John A., 4,702,878, Cl. 376-249.000.
Stucker, David L., 4,702,882, Cl. 376-446.000.
Tower, Stephen N.; and Schulz, Terry L., 4,702,879, Cl. 376-282.000.
Weiland, Lynne E.; and Parks, Beryl H., 4,702,881, Cl. 376-442.000.
Wilson, John F.; Seel, David D.; and Pepka, James M., 4,702,883, Cl. 376-446.000.
Westlund, Arnold E., Jr.: *See*—
Ochoa, Carlos G.; Aguilar, German C.; and Westlund, Arnold E., Jr., 4,703,221, Cl. 313-332.000.
Westvaco Corporation: *See*—
Osborne, Edward L., 4,702,409, Cl. 229-125.000.
Westwood, Samuel M., III. Clamp device. 4,702,447, Cl. 248-231.500.
Weyer, Michael: *See*—
Mueller, Wilhelm; Overath, Friedhelm; and Weyer, Michael, 4,702,498, Cl. 285-55.000.
Wheeler, Gilbert A.; Church, Gregg A.; Tucker, Charles L.; and Ward, William R., to McCormick & Company, Inc. Food forming device. 4,702,687, Cl. 425-227.000.
Whisler, Edwin L.; Griswold, Frederick D., Jr.; and Neagle, Stuart L., to Deere & Company. Adjustable armrest with integral vehicle controls. 4,702,520, Cl. 297-417.000.
White, Lawrence K.; and Brown, Richard, to RCA Corporation. Treatment of planarizing layer in multilayer electron beam resist. 4,702,993, Cl. 430-296.000.
White, Philip D., to U.S. Philips Corporation. System identification in communications system. 4,703,324, Cl. 340-825.140.
White, Robert E.: *See*—
Mancuso, Jon R.; Fromknecht, Thomas G.; and White, Robert E., 4,702,359, Cl. 192-56.00R.
White, William H.: *See*—
Ashlock, Lysander T.; Mukamal, Harold; and White, William H., 4,702,773, Cl. 106-287.120.
Whitehouse, Craig M.: *See*—
Luther, Ronald B.; Snyder, Daniel R.; and Whitehouse, Craig M., 4,702,735, Cl. 604-161.000.
Whiteley, John; and Shepherd, Fred A., to Hollingsworth U.K., Ltd. Friction spinning roller. 4,702,068, Cl. 57-401.000.
Whiteside, Neil A.: *See*—
Brooks, Kenneth J.; Wilkinson, Michael A.; Hannam, Peter H.; and Whiteside, Neil A., 4,702,252, Cl. 128-344.000.
Whynacht, Charles: *See*—
Chamberlin, Frederick C.; Whynacht, Charles; Carter, Peter D.; and Wilson, Charles S., 4,703,325, Cl. 340-825.170.
Whyne, Conrad: *See*—
Silver, Frederick A.; Berg, Richard A.; Birk, David E.; Weadock, Kevin; and Whyne, Conrad, 4,703,108, Cl. 530-356.000.
Widlak, Marinus C. M., to Autobedrijf de Beemd. Device for chipping wood-like material. 4,702,424, Cl. 241-101.700.
Wienand, Henning: *See*—
Ostertag, Werner; Wienand, Henning; and Bauer, Roland, 4,702,775, Cl. 106-304.000.
Wies, Georges: *See*—
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Vail, Curtis F.; and Witzke, Duane W., 4,702,522, Cl. 297-452.000.
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Lecoffre, Yves; and Woillez, Jacques, 4,702,837, Cl. 210-512.300.
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Kwasnitza, Hans D., 4,702,135, Cl. 83-278.000.
Wombold, Harry A. E., to Packaging Resources Inc. Container and plastic closure therefor. 4,702,387, Cl. 220-270.000.
Woo, James, to Tektronix, Inc. Wideband amplifier with active high-frequency compensation. 4,703,285, Cl. 330-260.000.
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Wood, Eric, to Insituform International N.V. Relating to cutters. 4,701,988, Cl. 29-33.00T.
Wood, Timothy J. Deco-plex process. 4,702,942, Cl. 427-259.000.
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Wright, George M.; and Blake, Larry W., to Innovative Surgical Products, Inc. Foot actuated pinch valve and high vacuum source for irrigation/aspiration handpiece system. 4,702,733, Cl. 604-34.000.
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Wruck, Paul D.; and Ryan, Adrian J., to Marathon Oil Company. Process for conveying raw coal. 4,702,421, Cl. 241-15.000.
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Redmond, Donald R.; and Dieckman, John H., 4,703,371, Cl. 360-75.000.
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Baroody, Anthony J., Jr., 4,703,515, Cl. 382-46.000.
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Takeshima, Sadao; and Yabe, Hideo, 4,702,334, Cl. 180-142.000.
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Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,703,095, Cl. 526-247.000.
Yamaguchi, Shuuji: *See*—
Kato, Hisaaki; Yamaguchi, Shuuji; and Okazaki, Toshiharu, 4,702,515, Cl. 296-189.000.
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Izutsu, Hitoshi; and Yamaguchi, Toshihide, 4,703,074, Cl. 524-262.000.
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Hisano, Atushi; Yamaguchi, Yoshinori; Masaki, Toshimichi; Saka, Kazuhiko; Nakatsuka, Nobuo; and Kato, Mitsutaka, 4,703,344, Cl. 358-60.000.
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Imamura, Tatsuo; Yamamoto, Hiroyuki; and Yunoki, Yutaka, 4,703,380, Cl. 360-121.000.

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Murata, Yasuto; Tezuka, Junichi; and Yamamoto, Kenji, 4,702,811, Cl. 204-206.000.

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Yamamoto, Shigehiro; Hashimoto, Terukuni; Kobayashi, Mitsuo; Iwaki, Tsugishige; Tamura, Katsushige; and Saijo, Hideo, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method for manufacture of fiber reinforced thermosetting resin molding material. 4,702,872, Cl. 264-114.000.

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Imai, Kazuo; Niigata, Kunihiro; Fujikura, Takashi; Hashimoto, Shinichi; and Takenaka, Toichi, 4,703,063, Cl. 514-603.000.

Yamasaki, Hidenori: *See*—
Nakamura, Tsuneo; Yamasaki, Hidenori; Kira, Tohru; and Yoshikawa, Mitsuhiko, 4,702,794, Cl. 156-643.000.

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Matsumoto, Masakazu; Takiguchi, Takao; Yamashita, Masataka; Umehara, Shoji; and Ishikawa, Shozo, 4,702,982, Cl. 430-72.000.

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Umino, Shigeru; Yamato, Koji; Kimura, Hajime; and Ichida, Toshio, 4,702,802, Cl. 204-28.000.

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Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, 4,702,968, Cl. 428-623.000.

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Yasunaga, Tadashi; Yanai, Akio; and Shirahata, Ryuji, 4,702,938, Cl. 427-132.000.

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Pall, David B.; Degen, Peter J.; Gsell, Thomas C.; and Yanakis, Eleni C., 4,702,947, Cl. 428-36.000.

Yanase, Tsunao, to Kaho Musen Limited. Controlled-drive toy. 4,702,718, Cl. 446-175.000.

Yang, Elmer C., to Pacific Scientific Company. Acceleration limiter. 4,702,353, Cl. 188-135.000.

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Kelley, Anthony D.; Finley, James W.; Eachus, Vernon F.; Lim, Richard A.; and Yano, Miles K., 4,702,439, Cl. 244-158.00A.

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Noe, Renato R.; and Yarden, Abraham L., 4,702,308, Cl. 165-76.000.

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Kano, Toshio; Knodo, Masamichi; Ikeda, Tatsufumi; and Morikawa, Chiharu, 4,703,059, Cl. 514-493.000.

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Bhattacharjee, Shyam S.; Hull, Michael N.; and Yasnovsky, Vacheslav M., 4,702,807, Cl. 204-133.000.

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Enomoto, Hiromu; Yasuda, Yasushi; Tahara, Akinori; and Kumagai, Masao, 4,703,202, Cl. 307-443.000.

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Yates, Donald N., Jr.: *See*—
Colle, Edward A., Jr.; Yates, Donald N., Jr.; and Brieger, Emmet F., 4,702,168, Cl. 102-313.000.

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Igi, Hisashi; Yamada, Tomohiro; Higuchi, Tomohisa; Ohta, Eiichi; and Yazawa, Hiroaki, 4,702,630, Cl. 400-82.000.

Yokagawa Medical Systems, Limited: *See*—
Moriyama, Masao; Ohta, Masahiro; Yagi, Toshiaki; and Kawano, Kazuhiro, 4,702,257, Cl. 128-653.000.

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Ishii, Wataru; Miyazawa, Shozo; Tsuchiya, Shinji; Nakane, Hisashi; and Yokota, Akira, 4,702,992, Cl. 430-272.000.

Yokoyama, Tamio: *See*—
Nakayama, Toshiaki; Kohama, Tokio; Okada, Isamu; and Yokoyama, Tamio, 4,702,940, Cl. 427-244.000.

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Araki, Mikio; Yonamine, Shigeru; and Yukawa, Kouichi, 4,702,163, Cl. 101-35.000.

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Katou, Yoshiaki; Ueoka, Joe; and Yoshida, Satoshi, 4,703,383, Cl. 360-126.000.

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Haruta, Kazumi; and Yoshida, Shigeru, 4,702,216, Cl. 123-520.000.

Yoshida, Yasuharu, to NEC Corporation. Digital demodulation system. 4,703,282, Cl. 329-50.000.

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Yui, Hiroshi: *See*—
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Araki, Mikio; Yonamine, Shigeru; and Yukawa, Kouichi, 4,702,163, Cl. 101-35.000.

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Imamura, Tatsuo; Yamamoto, Hiroyuki; and Yunoki, Yutaka, 4,703,380, Cl. 360-121.000.

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Kanchev, Peter K., 4,703,509, Cl. 381-191.000.

Zdinak, Matthew J.: *See*—
Benner, Harold T., Jr.; Leonhardt, Mark A.; and Zdinak, Matthew J., 4,702,289, Cl. 141-125.000.

Zedrosser, Ulrich, to Steyr-Daimler-Puch AG. Cocking slide for automatic hand firearms. 4,702,144, Cl. 89-1.400.

Zeiler, Hans-Joachim: *See*—
Petersen, Uwe; Grohe, Klaus; Zeiler, Hans-Joachim; and Metzger, Karl G., 4,703,047, Cl. 514-254.000.

Zelczer, Alex; and Zelczer, Ruth. Zone control apparatus for central heating and/or cooling systems. 4,702,412, Cl. 236-46.00R.

Zelczer, Ruth: *See*—
Zelczer, Alex; and Zelczer, Ruth, 4,702,412, Cl. 236-46.00R.

Zenhausern, Heinrich. Anchor step. 4,702,349, Cl. 182-90.000.

Zenith Electronics Corporation: *See*—
Auld, Frederick H., Jr.; and Walker, David L., 4,703,354, Cl. 358-148.000.
Krause, Charles A.; Rajaram, Babu; and Watzman, Barry A., 4,703,419, Cl. 364-200.000.

Zibis, Peter; and Veith, Richard, to Siemens Aktiengesellschaft. Acoustic wave filter. 4,703,290, Cl. 333-195.000.

Zierhut, Hermann, to Richard Hirschmann Radiotechnisches Werk. Cardan ball suspension for motion sensor. 4,702,449, Cl. 248-288.300.

Zimm, Carl B.: *See*—
Barclay, John A.; Stewart, Walter F.; Prenger, F. Coyne; Zimm, Carl B.; and Parsons, John P., 4,702,090, Cl. 62-3.000.

Zimmer, Guenter: *See*—
Herre, Emil; Herre, Gerd; Zimmer, Guenter; and Cepin, Hermann, 4,702,461, Cl. 266-216.000.

Zimmer, Richard: *See*—
Burckhardt, Manfred; and Zimmer, Richard, 4,702,337, Cl. 180-197.000.

Zimmermann, E. Harald: *See*—
Frischmann, Albert; Rieger, Johannes; Mermi, Kurt; Kistner, Herbert; and Zimmermann, E. Harald, 4,702,654, Cl. 411-31.000.

Zobel, Jurgen, to Richard Wolf GmbH. Endoscope with a measuring device. 4,702,229, Cl. 128-4.000.

Zondler, Rolf; and Pottharst, Jurgen, to Standard Electrik Lorenz. Liquid-crystal display made from continuous plastic film split and folded through 90 degrees. 4,702,559, Cl. 350-331.00R.

Zucker, Marjorie: *See*—
Thorbecke, G. Jeanette; and Zucker, Marjorie, 4,702,908, Cl. 424-88.000.

Zurn Industries, Inc.: *See*—
Mancuso, Jon R.; Fromknecht, Thomas G.; and White, Robert E., 4,702,359, Cl. 192-56.00R.

1K Entertainment Center Ltd.: *See*—
Parker, Lorne A., 4,703,465, Cl. 369-30.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF OCTOBER, 1987

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ackeret, Peter, to Licinvest AG. Container for pictures having similar formats. Re. 32,528, Cl. 40-513.000.

Aluminum Pechiney: *See*—
Vives, Charles, Re. 32,529, Cl. 164-467.000.

Amano Pharmaceutical Co., Ltd.: *See*—
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, Re. 32,534, Cl. 514-15.000.

Beck, Nicholas R.; Leonard, Gordon C.; and Prince, Jack A., to Kartridg Pak Co., The. Deboning apparatus and method. Re. 32,531, Cl. 241-24.000.

Cantey, Bryant W., Jr. Shipping pallet. Re. 32,530, Cl. 206-392.000.

Hiyama, Takashi: *See*—
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, Re. 32,534, Cl. 514-15.000.

Kartridg Pak Co., The: *See*—
Beck, Nicholas R.; Leonard, Gordon C.; and Prince, Jack A., Re. 32,531, Cl. 241-24.000.

Leonard, Gordon C.: *See*—
Beck, Nicholas R.; Leonard, Gordon C.; and Prince, Jack A., Re. 32,531, Cl. 241-24.000.

Licinvest AG: *See*—
Ackeret, Peter, Re. 32,528, Cl. 40-513.000.

Page, Philip R.: *See*—
Villax, Ivan; and Page, Philip R., Re. 32,535, Cl. 260-351.500.

Phillips Petroleum Company: *See*—
Trepka, William J.; and Sonnenfeld, Richard J., Re. 32,533, Cl. 44-62.000.

Plurichemie Anstalt: *See*—
Villax, Ivan; and Page, Philip R., Re. 32,535, Cl. 260-351.500.

Prince, Jack A.: *See*—
Beck, Nicholas R.; Leonard, Gordon C.; and Prince, Jack A., Re. 32,531, Cl. 241-24.000.

Sonerud, John T. Pipelaying appliance. Re. 32,532, Cl. 414-747.000.

Sonnenfeld, Richard J.: *See*—
Trepka, William J.; and Sonnenfeld, Richard J., Re. 32,533, Cl. 44-62.000.

Sugiura, Nobuo: *See*—
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, Re. 32,534, Cl. 514-15.000.

Trepka, William J.; and Sonnenfeld, Richard J., to Phillips Petroleum Company. Hydrocarbon fuels with carburetor detergent properties. Re. 32,533, Cl. 44-62.000.

Villax, Ivan; and Page, Philip R., to Plurichemie Anstalt. Process for the preparation of α-6-deoxytetracyclines. Re. 32,535, Cl. 260-351.500.

Vives, Charles, to Aluminum Pechiney. Process for the electromagnetic casting of metals involving the use of at least one magnetic field which differs from the field of confinement. Re. 32,529, Cl. 164-467.000.

Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, to Amano Pharmaceutical Co., Ltd. Peptides, process for preparing the same and psychodepressant compositions containing the same. Re. 32,534, Cl. 514-15.000.

LIST OF DESIGN PATENTEES

Alfredo, Cavalli. Combined steam iron support and water tank. 292,537, 10-27-87, Cl. D32-73.000.

Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, to Kenner Parker Toys Inc. Toy vehicle. 292,521, 10-27-87, Cl. D21-77.000.

American College, The: *See*—
Croker, Sherrie; DiLullo, Charles S.; Bruhin, David W.; Brown, Elsie; and Pollock, D. Bruce, 292,502, Cl. D11-81.000.

American Cyanamid Company: *See*—
Keeler, James M.; and Grip, John A., 292,484, Cl. D9-370.000.

American Hospital Supply Corporation: *See*—
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,527, Cl. D24-17.000.

Anderson, Mike. Combined brush and sponge. 292,449, 10-27-87, Cl. D4-116.000.

Andersson, Lars-Gunnar L. Headband earplugs. 292,530, 10-27-87, Cl. D24-67.000.

Anton, Christian: *See*—
Arnoux, Daniel; Genter, Claude; and Anton, Christian, 292,496, Cl. D10-79.000.

Arnoux, Daniel; Genter, Claude; and Anton, Christian. Clamp-on ammeter-wattmeter. 292,496, 10-27-87, Cl. D10-79.000.

Arrowhead Puritas Waters, Inc.: *See*—
Runyon, Richard C., 292,466, Cl. D7-306.000.
Runyon, Richard C., 292,467, Cl. D7-306.000.

Baker, Knapp & Tubbs, Inc.: *See*—
Doezema, William, 292,458, Cl. D6-484.000.

Baker, Neil E.: *See*—
Hawkins, Francis M.; and Baker, Neil E., 292,510, Cl. D12-317.000.

Basaraba, Louis, to Basaraba, Louis; and Basaraba, Shirley. Boot drying rack. 292,534, 10-27-87, Cl. D32-58.000.

Basaraba, Shirley: *See*—
Basaraba, Louis, 292,534, Cl. D32-58.000.

Beauchan, Keith M. Flip top can opener or similar article. 292,479, 10-27-87, Cl. D8-40.000.

Block Drug Co., Inc.: *See*—
Hoyt, Earl, 292,488, Cl. D9-443.000.

Bloom, William G.: *See*—
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,527, Cl. D24-17.000.

Bollinger, Howard N.: *See*—
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,521, Cl. D21-77.000.

Britt, William J., to Dow Chemical Company, The. Bottle. 292,485, 10-27-87, Cl. D9-375.000.

Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, to Cigarette Racing Team, Inc. Power boat hatch. 292,511, 10-27-87, Cl. D12-317.000.

Brown, Elsie: *See*—
Croker, Sherrie; DiLullo, Charles S.; Bruhin, David W.; Brown, Elsie; and Pollock, D. Bruce, 292,502, Cl. D11-81.000.

Bruhin, David W.: *See*—
Croker, Sherrie; DiLullo, Charles S.; Bruhin, David W.; Brown, Elsie; and Pollock, D. Bruce, 292,502, Cl. D11-81.000.

Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, to American Hospital Supply Corporation. Handle with sidearm for a diagnostic urinemeter unit. 292,527, 10-27-87, Cl. D24-17.000.

Cari-All Inc.: *See*—
Trubiano, Angoine, 292,538, Cl. D34-27.000.

Cigarette Racing Team, Inc.: *See*—
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 292,511, Cl. D12-317.000.

Commisso, Nicholas D.; De Cook, Edwin R.; Hisle, Ralph E.; and Rowe, Donald, to McDonald's Corporation. Dual compartment sandwich package. 292,483, 10-27-87, Cl. D9-341.000.

Croker, Sherrie; DiLullo, Charles S.; Bruhin, David W.; Brown, Elsie; and Pollock, D. Bruce, to American College, The. Jewelry key. 292,502, 10-27-87, Cl. D11-81.000.

Curiel C., Ernesto C. Pontoon boat. 292,509, 10-27-87, Cl. D12-316.000.

Curtis Manufacturing Company, Inc.: *See*—
Hames, Edward L., 292,512, Cl. D13-11.000.

De Cook, Edwin R.: *See*—
Commisso, Nicholas D.; De Cook, Edwin R.; Hisle, Ralph E.; and Rowe, Donald, 292,483, Cl. D9-341.000.

DiLullo, Charles S.: *See*—
Croker, Sherrie; DiLullo, Charles S.; Bruhin, David W.; Brown, Elsie; and Pollock, D. Bruce, 292,502, Cl. D11-81.000.

Dr. Pepper: *See*—
Sullivan, James H., 292,519, Cl. D20-5.000.

Doerner, Frank. Chair control. 292,459, 10-27-87, Cl. D6-500.000.

Doezema, William, to Baker, Knapp & Tubbs, Inc. Console or the like. 292,458, 10-27-87, Cl. D6-484.000.

Dow Chemical Company, The: *See*—
Britt, William J., 292,485, Cl. D9-375.000.

Eastern Company, The: *See—*
Weinerman, Lee S.; and Rachocki, Michael J., 292,482, Cl. D8-302.000.
Eddy, Loren K. Finger ring with beverage can-opening hook. 292,499, 10-27-87, Cl. D11-2.000.
Eisenhauer, David P., to NCR Corporation. Alignment template or similar article. 292,495, 10-27-87, Cl. D10-64.000.
Etablissements le Simplex: *See—*
Juy, Henri, 292,503, Cl. D12-124.000.
EZ Mail Corporation: *See—*
Harlow, Albert L., Jr.; and Felske, Arthur M., 292,539, Cl. D99-29.000.
EZ Paintr Corporation: *See—*
Moon, Howard R., 292,450, Cl. D4-122.000.
Felske, Arthur M.: *See—*
Harlow, Albert L., Jr.; and Felske, Arthur M., 292,539, Cl. D99-29.000.
Fireplugs, Inc.: *See—*
Gilbert, N. Carol, 292,446, Cl. D3-44.000.
Fisher, Walter A. Rotisserie motor for a barbecue spit. 292,473, 10-27-87, Cl. D7-402.000.
Ford, Jere B., Jr. Finger ring. 292,500, 10-27-87, Cl. D11-26.000.
Friedline, Floyd W. Champagne bottle opener. 292,478, 10-27-87, Cl. D8-33.000.
Gamm, Robert J., to Kangaroos U.S.A., Inc. Sandal with strap pocket. 292,441, 10-27-87, Cl. D2-265.000.
Genter, Claude: *See—*
Arnoux, Daniel; Genter, Claude; and Anton, Christian, 292,496, Cl. D10-79.000.
Gilbert, N. Carol, to Fireplugs, Inc. Luggage case. 292,446, 10-27-87, Cl. D3-44.000.
Gilberton, Paul, to Thomson-CSF Telephone S.A. Handset telephone. 292,513, 10-27-87, Cl. D14-53.000.
Gowens, Robert B.: *See—*
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 292,511, Cl. D12-317.000.
Grip, John A.: *See—*
Keeler, James M.; and Grip, John A., 292,484, Cl. D9-370.000.
Hames, Edward L., to Curtis Manufacturing Company, Inc. Telephone modem surge protector. 292,512, 10-27-87, Cl. D13-11.000.
Harlow, Albert L., Jr.; and Felske, Arthur M., to EZ Mail Corporation. Slidable tray insert for a mailbox. 292,539, 10-27-87, Cl. D99-29.000.
Hatta, Chikako: *See—*
Nakagawa, Takehisa; Huke, Mitsutaka; and Hatta, Chikako, 292,469, Cl. D7-350.000.
Hawkins, Francis M.; and Baker, Neil E. Transom shroud for the rear end of a boat. 292,510, 10-27-87, Cl. D12-317.000.
Hayashi, Takatoshi, to Kabishi Electric Co. Siren. 292,498, 10-27-87, Cl. D10-120.000.
Hisle, Ralph E.: *See—*
Commisso, Nicholas D.; De Cook, Edwin R.; Hisle, Ralph E.; and Rowe, Donald, 292,483, Cl. D9-341.000.
Holcomb, Jack N. Radio case with antenna. 292,514, 10-27-87, Cl. D14-76.000.
Hoyt, Earl, to Block Drug Co., Inc. Container cover. 292,488, 10-27-87, Cl. D9-443.000.
Huke, Mitsutaka: *See—*
Nakagawa, Takehisa; Huke, Mitsutaka; and Hatta, Chikako, 292,469, Cl. D7-350.000.
Hunter, David E. Collapsible gun rack. 292,457, 10-27-87, Cl. D6-469.000.
Ihlenburg, Frederick. Athletic shoe sole. 292,443, 10-27-87, Cl. D2-320.000.
International Business Machines Corporation: *See—*
Martin, Randall W., 292,515, Cl. D14-100.000.
J&L Importers, Inc.: *See—*
Oh, Chang H., 292,470, Cl. D7-354.000.
Oh, Chang H., 292,471, Cl. D7-360.000.
Oh, Chang H., 292,472, Cl. D7-360.000.
Jenkins, Valentine: *See—*
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 292,511, Cl. D12-317.000.
Jim O'Neal Distributing, Inc.: *See—*
O'Neal, James M., 292,517, Cl. D18-30.000.
O'Neal, James M., 292,518, Cl. D18-30.000.
John Fluke Mfg., Co., Inc.: *See—*
King, Indle G., 292,493, Cl. D10-57.000.
King, Indle G., 292,494, Cl. D10-57.000.
Johnson & Johnson Dental Products Company: *See—*
Weissenburger, Edward A., 292,528, Cl. D24-56.000.
Jones, Sandra. Earring. 292,501, 10-27-87, Cl. D11-61.000.
Jorgensen, Susan D. Child's safety seat for use primarily in a shopping cart. 292,451, 10-27-87, Cl. D6-333.000.
Judge, Andrew. Vehicle steering wheel tray. 292,445, 10-27-87, Cl. D3-40.000.
Juy, Henri, to Etablissements le Simplex. Bicycle rear derailleur. 292,503, 10-27-87, Cl. D12-124.000.
Kabishi Electric Co.: *See—*
Hayashi, Takatoshi, 292,498, Cl. D10-120.000.
Kangaroos U.S.A., Inc.: *See—*
Gamm, Robert J., 292,441, Cl. D2-265.000.
Kea, John E., to Westvaco Corporation. Carrying carton. 292,487, 10-27-87, Cl. D9-432.000.
Keeler, James M.; and Grip, John A., to American Cyanamid Company. Combined dispensing container and solid stick product. 292,484, 10-27-87, Cl. D9-370.000.
Kelsey-Hayes Company: *See—*
McKeon, James P., 292,506, Cl. D12-211.000.
Reid, Donald J., 292,507, Cl. D12-211.000.
Kenner Parker Toys Inc.: *See—*
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,521, Cl. D21-77.000.
King, Indle G., to John Fluke Mfg., Co., Inc. Digital electronic thermometer or similar article. 292,493, 10-27-87, Cl. D10-57.000.
King, Indle G., to John Fluke Mfg. Co., Inc. Digital electronic thermometer or similar article. 292,494, 10-27-87, Cl. D10-57.000.
Kitchen, Robert J. Plant stake. 292,475, 10-27-87, Cl. D8-1.000.
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, to Proctor & Gamble Company, The. Pouring attachment for bottles. 292,489, 10-27-87, Cl. D9-447.000.
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, to Procter & Gamble Company, The. Pouring attachment for bottles. 292,490, 10-27-87, Cl. D9-447.000.
Landreth, Dennis. Hand loop for jeans. 292,440, 10-27-87, Cl. D2-25.000.
Les Prismatiques, Inc.: *See—*
Van Deelen, Jerry, 292,525, Cl. D26-85.000.
Van Deelen, Jerry, 292,531, Cl. D26-87.000.
Lever Brothers Company: *See—*
Tyler, Frank S., 292,486, Cl. D9-394.000.
Vianello, Gianni, 292,448, Cl. D4-104.000.
Lobodzinski, Richard: *See—*
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,527, Cl. D24-17.000.
Macias, Richard. Disposable toothbrush. 292,447, 10-27-87, Cl. D4-104.000.
Malin, Stephen C. Cervical pillow. 292,460, 10-27-87, Cl. D6-601.000.
Martin, Randall W., to International Business Machines Corporation. Computer cabinet. 292,515, 10-27-87, Cl. D14-100.000.
Mazda Motor Corporation: *See—*
Oda, Yasuji, 292,505, Cl. D12-169.000.
McDonald's Corporation: *See—*
Commisso, Nicholas D.; De Cook, Edwin R.; Hisle, Ralph E.; and Rowe, Donald, 292,483, Cl. D9-341.000.
McKeon, James P., to Kelsey-Hayes Company. Vehicle wheel center. 292,506, 10-27-87, Cl. D12-211.000.
Moon, Howard R., to EZ Paintr Corporation. Combined paint roller and spatter shield. 292,450, 10-27-87, Cl. D4-122.000.
Myers, David A.: *See—*
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,521, Cl. D21-77.000.
Myers, Marion P. Ironing board guard. 292,535, 10-27-87, Cl. D32-66.000.
Nakagawa, Takehisa; Huke, Mitsutaka; and Hatta, Chikako, to Sharp Corporation. Toaster oven. 292,469, 10-27-87, Cl. D7-350.000.
Nakayama, Toshio, to Tokyo Kogaku Kikai Kabushiki Kaisha. Stand for mounting ophthalmologic instruments. 292,526, 10-27-87, Cl. D24-1.100.
NCR Corporation: *See—*
Eisenhauer, David P., 292,495, Cl. D10-64.000.
Nichols, Mark. Fishing lure. 292,524, 10-27-87, Cl. D22-126.000.
North American Philips Corporation: *See—*
Tsuji, Masao, 292,536, Cl. D32-69.000.
Oda, Yasuji, to Mazda Motor Corporation. Car rear bumper. 292,505, 10-27-87, Cl. D12-169.000.
Oh, Chang H., to J&L Importers, Inc. Fry pan or similar article. 292,470, 10-27-87, Cl. D7-354.000.
Oh, Chang H., to J&L Importers, Inc. Cooking utensil or similar article. 292,471, 10-27-87, Cl. D7-360.000.
Oh, Chang H., to J&L Importers, Inc. Fry pan or similar article. 292,472, 10-27-87, Cl. D7-360.000.
O'Neal, James M., to Jim O'Neal Distributing, Inc. Font of sign letters or the like. 292,517, 10-27-87, Cl. D18-30.000.
O'Neal, James M., to Jim O'Neal Distributing, Inc. Font of sign letters or the like. 292,518, 10-27-87, Cl. D18-30.000.
Opsvik, Peter. Chair. 292,453, 10-27-87, Cl. D6-335.000.
Palmateer, Ronald T. Electro-magnet probe. 292,476, 10-27-87, Cl. D8-14.000.
Pankopf, Bradford H. Legging. 292,444, 10-27-87, Cl. D2-330.000.
Pardo, John: *See—*
Ross, Samuel; and Pardo, John, 292,491, Cl. D9-447.000.
Ross, Samuel; and Pardo, John, 292,492, Cl. D9-453.000.
Petrasek, Vladislav P. Drinking cup. 292,462, 10-27-87, Cl. D7-5.000.
Petrasek, Vladislav P. Drinking cup. 292,463, 10-27-87, Cl. D7-5.000.
Petrasek, Vladislav P. Drinking cup. 292,464, 10-27-87, Cl. D7-9.000.
Pollock, D. Bruce: *See—*
Croker, Sherrie; DiLullo, Charles S.; Bruhin, David W.; Brown, Elsie; and Pollock, D. Bruce, 292,502, Cl. D11-81.000.
Procter & Gamble Company, The: *See—*
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, 292,490, Cl. D9-447.000.
Ross, Samuel; and Pardo, John, 292,492, Cl. D9-453.000.
Proctor & Gamble Company, The: *See—*
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, 292,489, Cl. D9-447.000.
Ross, Samuel; and Pardo, John, 292,491, Cl. D9-447.000.
Raab, Richard M. Bowsight. 292,523, 10-27-87, Cl. D22-107.000.
Rachocki, Michael J.: *See—*
Weinerman, Lee S.; and Rachocki, Michael J., 292,482, Cl. D8-302.000.
Racicot, Gerald. Canoe carrier for all-terrain vehicle. 292,504, 10-27-87, Cl. D12-156.000.

Rehband Anatomiska AB: *See*—
Saare, Ants, 292,529, Cl. D24-64.000.
Reid, Donald J., to Kelsey-Hayes Company. Vehicle wheel center. 292,507, 10-27-87, Cl. D12-211.000.
Robert Krups Stiftung & Co. KG: *See*—
Strosberg, Gunter, 292,497, Cl. D10-92.000.
Ross, Samuel; and Pardo, John, to Proctor & Gamble Company, The. Pouring attachment for bottles. 292,491, 10-27-87, Cl. D9-447.000.
Ross, Samuel; and Pardo, John, to Procter & Gamble Company, The. Combined closure and measuring cup. 292,492, 10-27-87, Cl. D9-453.000.
Rowe, Donald: *See*—
Commisso, Nicholas D.; De Cook, Edwin R.; Hisle, Ralph E.; and Rowe, Donald, 292,483, Cl. D9-341.000.
Runyon, Richard C., to Arrowhead Puritas Waters, Inc. Bottled water dispenser. 292,466, 10-27-87, Cl. D7-306.000.
Runyon, Richard C., to Arrowhead Puritas Waters, Inc. Bottled water dispenser. 292,467, 10-27-87, Cl. D7-306.000.
Ryan, Delvin R., Jr., to Salton, Inc. Coffee maker. 292,468, 10-27-87, Cl. D7-309.000.
Rykken, Oddvin. Chair. 292,452, 10-27-87, Cl. D6-335.000.
Rykken, Oddvin. Chair. 292,454, 10-27-87, Cl. D6-335.000.
Rykken, Oddvin. Chair. 292,455, 10-27-87, Cl. D6-335.000.
Saare, Ants, to Rehband Anatomiska AB. Hyperextension orthosis brace. 292,529, 10-27-87, Cl. D24-64.000.
Salton, Inc.: *See*—
Ryan, Delvin R., Jr., 292,468, Cl. D7-309.000.
Saraga, Edward J. Paint tray. 292,533, 10-27-87, Cl. D32-53.100.
Session, Ardis. Mug. 292,465, 10-27-87, Cl. D7-9.000.
Sharp Corporation: *See*—
Nakagawa, Takehisa; Huke, Mitsutaka; and Hatta, Chikako, 292,469, Cl. D7-350.000.
Shuckman, George. Bath towel with pockets. 292,461, 10-27-87, Cl. D6-608.000.
Shyi-Kuan, Chern. Wrench. 292,477, 10-27-87, Cl. D8-21.000.
Siegel, Bernard: *See*—
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,527, Cl. D24-17.000.
Simpson, Eric J.: *See*—
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,521, Cl. D21-77.000.
Smirne, Frank S. Portable staple holder. 292,480, 10-27-87, Cl. D8-71.000.
Sneller, Jack A.: *See*—
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, 292,489, Cl. D9-447.000.
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, 292,490, Cl. D9-447.000.
Speidel, George S., III: *See*—
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, 292,489, Cl. D9-447.000.
Kowollik, Mathias M.; Sneller, Jack A.; and Speidel, George S., III, 292,490, Cl. D9-447.000.
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Strosberg, Gunter, to Robert Krups Stiftung & Co. KG. Bathroom scale. 292,497, 10-27-87, Cl. D10-92.000.
Stuckmayer, Jack. Dice agitator. 292,520, 10-27-87, Cl. D21-41.000.
Sullivan, James H., to Dr. Pepper. Vending machine or similar article. 292,519, 10-27-87, Cl. D20-5.000.
Thompson, Larry D. Tennis racquet. 292,522, 10-27-87, Cl. D21-212.000.
Thomson-CSF Telephone S.A.: *See*—
Gilberton, Paul, 292,513, Cl. D14-53.000.
Tokyo Kogaku Kikai Kabushiki Kaisha: *See*—
Nakayama, Toshio, 292,526, Cl. D24-1.100.
Trubiano, Angoine, to Cari-All Inc. Handle bar support rod for shopping cart. 292,538, 10-27-87, Cl. D34-27.000.
Tsuji, Masao, to North American Philips Corporation. Travel iron. 292,536, 10-27-87, Cl. D32-69.000.
Tyler, Frank S., to Lever Brothers Company. Packaging cup or the like. 292,486, 10-27-87, Cl. D9-394.000.
Ubezio, Antonio. Twin hull vessel with propeller. 292,508, 10-27-87, Cl. D12-306.000.
Van Deelen, Jerry, to Les Prismatiques, Inc. Sconce. 292,525, 10-27-87, Cl. D26-85.000.
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Vianello, Gianni, to Lever Brothers Company. Toothbrush. 292,448, 10-27-87, Cl. D4-104.000.
Wadsworth, Ben R. Shoe decoration. 292,442, 10-27-87, Cl. D2-315.000.
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Kea, John E., 292,487, Cl. D9-432.000.
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Young, William J. Edging unit for garden landscaping. 292,474, 10-27-87, Cl. D8-1.000.

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Jost, Michael D. Peach tree (Sierra Lady). 6,045, 10-27-87, Cl. 43.000.

CLASSIFICATION OF PATENTS

ISSUED OCTOBER 27, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

15	4,701,962
161 A	4,701,963
406	4,701,964
428	4,701,965

CLASS 4

213	4,701,966

CLASS 5

450	4,701,967

CLASS 8

115.6	4,702,741
495	4,702,742
527	4,702,743
	4,702,744

CLASS 15

21 A	4,701,968
79 R	4,701,969
98	4,701,970
250.21	4,701,971
250.22	4,701,972
306 B	4,701,973
323	4,701,974
383	4,701,975
385	4,701,976

CLASS 16

266	4,701,977
346	4,701,979
380	4,701,978

CLASS 19

0.48	4,701,980
105	4,701,981

CLASS 24

273	4,701,982
511	4,701,983
573	4,701,984

CLASS 26

10 C	4,701,985

CLASS 28

142	4,701,986

CLASS 29

25.35	4,701,987
33 T	4,701,988
271	4,701,989
441 R	4,701,990
450	4,701,991
523	4,701,993
568	4,701,994
720	4,702,001
837	4,702,002
840	4,702,003

CLASS 30

57	4,702,004
276	4,702,005
	4,702,006
423	4,702,007

CLASS 33

1 T	4,702,008
126.6	4,702,009
178 F	4,702,010
268	4,702,011
464	4,702,012
558	4,702,013

CLASS 34

15	4,702,014
20	4,702,015
33	4,702,016
107	4,702,017
130	4,702,018
168	4,702,019

CLASS 36

11.5	4,702,020
62	4,702,021
119	4,702,022

CLASS 37

66	4,702,023
67	4,702,024

CLASS 40

156	4,702,025
159	4,702,026
513	Re.32,528

CLASS 42

1.02	4,702,030
76.02	4,702,027
90	4,702,028
94	4,702,029
195	4,702,939

CLASS 43

17	4,702,031
22	4,702,032
43.12	4,702,033
57.1	4,702,035

CLASS 44

10 D	4,702,745
14	4,702,746
51	4,702,747
56	4,702,748
62	Re.32,533

CLASS 47

33	4,702,034

CLASS 49

55	4,702,036
114	4,702,037
478	4,702,038
490	4,702,039
502	4,702,040

CLASS 51

165.71	4,702,041
321	4,702,042

CLASS 52

9	4,702,043
86	4,702,044
125.4	4,702,045
144	4,702,046
156	4,702,047
169.5	4,702,048
200	4,702,049
202	4,702,050
	4,702,051
224	4,702,052
309.7	4,702,053
311	4,702,054
456	4,702,055
484	4,702,056
514	4,702,057
584	4,702,058
651	4,702,059

CLASS 53

69	4,702,060
381 R	4,702,061

CLASS 55

33	4,702,749
48	4,702,750
96	4,702,751
131	4,702,752
267	4,702,753
274	4,702,754
418	4,702,755
473	4,702,756

CLASS 56

192	4,702,062
202	4,702,063
312	4,702,064
329	4,702,065
341	4,702,066

CLASS 57

243	4,702,067
401	4,702,068
417	4,702,069

CLASS 60

39.07	4,702,070
39.092	4,702,071
39.39	4,702,072
39.464	4,702,073
39.511	4,702,074
274	4,702,075
372	4,702,076
578	4,702,077
585	4,702,078
599	4,702,079
602	4,702,080
655	4,702,081
710	4,702,082
721	4,702,083

CLASS 62

3	4,702,090
24	4,702,757
101	4,702,085
113	4,702,086
285	4,702,087
324.1	4,702,088
471	4,702,089
532	4,702,758

CLASS 65

13	4,702,759
30.14	4,702,760

CLASS 66

171	4,702,091

CLASS 68

53	4,702,092

CLASS 70

164	4,702,093
241	4,702,094
279	4,702,095

CLASS 71

87	4,702,761
90	4,702,762
	4,702,763
92	4,702,764

CLASS 72

68	4,702,096
306	4,702,097
338	4,702,152
351	4,702,098
366	4,702,099
404	4,702,100

CLASS 73

1 R	4,702,101
19	4,702,102
146	4,702,103
	4,702,104
168	4,702,105
181	4,702,106
319	4,702,107
379	4,702,108
440	4,702,109
573	4,702,110
579	4,702,111
629	4,702,112
706	4,702,113
863.85	4,702,114
864.85	4,702,115
865.6	4,702,116

CLASS 74

89.17	4,702,117
200	4,702,118
371	4,702,119
	4,702,120
375	4,702,121
412 TA	4,702,122
526	4,702,123
675	4,702,124
695	4,702,125
800	4,702,126
866	4,702,127
	4,702,128

CLASS 75

0.5 B	4,702,765
34	4,702,766
49	4,702,767
65 R	4,702,768
233	4,702,769
236	4,702,770
241	4,702,771
243	4,702,772

CLASS 81

3.09	4,702,129
3.56	4,702,130
177.5	4,702,131

CLASS 82

40 R	4,702,132

CLASS 83

30	4,702,133
71	4,702,134
278	4,702,135
694	4,702,136
718	4,702,137
785	4,702,138
830	4,702,139

CLASS 84

1.01	4,702,140
	4,702,142
1.16	4,702,141
422 S	4,702,143

CLASS 89

1.4	4,702,144
1.803	4,702,145
193	4,702,146

CLASS 91

318	4,702,147
527	4,702,148

CLASS 92

128	4,702,150
237	4,702,151

CLASS 98

1	4,702,153
	4,702,154
2	4,702,155
37	4,702,149
40.24	4,702,156
97	4,702,157

CLASS 99

323.5	4,702,158
349	4,702,159
417	4,702,160
470	4,702,161
495	4,702,162

CLASS 101

35	4,702,163
91	4,702,164
114	4,702,165
415.1	4,702,166

CLASS 102

282	4,702,167
313	4,702,168
401	4,702,169
446	4,702,170
476	4,702,171
521	4,702,172

CLASS 104

130	4,702,173
172.2	4,702,174

CLASS 105

35	4,702,291
154	4,702,175

CLASS 106

287.12	4,702,773
287.24	4,702,774
304	4,702,775
309	4,702,776

CLASS 108

9	4,702,176

CLASS 110

110	4,702,177
193	4,702,178
215	4,702,179
263	4,702,180
264	4,702,181
347	4,702,182

CLASS 112

38	4,702,183
117	4,702,184
254	4,702,185

CLASS 114

39	4,702,186
40	4,702,187
56	4,702,188
61	4,702,189
103	4,702,190
106	4,702,191
122	4,702,192
354	4,702,193

CLASS 118

31.5	4,702,194
72	4,702,195
410	4,702,196

CLASS 119

14.18	4,702,197
23	4,702,198
99	4,702,199
	4,702,200

CLASS 123

2	4,702,201
52 M	4,702,202
52 MV	4,702,203
196 AB	4,702,204
236	4,702,205
246	4,702,206
302	4,702,207
339	4,702,208
	4,702,209
	4,702,210
421	4,702,211
472	4,702,212
480	4,702,213
488	4,702,214
514	4,702,215
520	4,702,216
523	4,702,217
559	4,702,219
593	4,702,220
606	4,702,221
643	4,702,222

CLASS 125

3	4,702,223

CLASS 126

8	4,702,224
116 A	4,702,225
362	4,702,226
417	4,702,227

CLASS 128

1.2	4,702,228
4	4,702,229
20	4,702,230
28	4,702,231
64	4,702,232
75	4,702,233
77	4,702,234
78	4,702,235
92 V	4,702,236
98.1	4,702,237
151	4,702,238
159	4,702,239
204.18	4,702,240
204.25	4,702,241
205.13	4,702,242
205.24	4,702,243
303 R	4,702,244
303.1	4,702,245
	4,702,246
325	4,702,247
328	4,702,248
	4,702,249
334 R	4,702,250
335	4,702,251
344	4,702,252
419 PG	4,702,253
421	4,702,254
586	4,702,255
639	4,702,256
653	4,702,257
660	4,702,258
734	4,702,259
753	4,702,260
754	4,702,261
804	4,702,262

CLASS 131

110	4,702,690
336	4,702,263
370	4,702,264

CLASS 132

118	4,702,265

CLASS 134

25.3	4,702,777
60	4,702,266
166 R	4,702,267

CLASS 136

258	4,703,131

CLASS 137

202	4,702,268
246.12	4,702,269
268	4,702,270
389	4,702,271
480	4,702,272
487.5	4,702,273
515.5	4,702,274
556	4,702,275
580	4,702,276
613	4,702,277
614.05	4,702,278
625.17	4,702,279
853	4,702,280

CLASS 138

120	4,702,281
176	4,702,282

CLASS 139

348	4,702,283
446	4,702,284
452	4,702,285
455	4,702,286

CLASS 141

4	4,702,287
67	4,702,288
125	4,702,289
332	4,702,290

CLASS 148

12 F	4,702,778
16.6	4,702,779
111	4,702,780
429	4,702,782

CLASS 152

209 R	4,702,292
531	4,702,293
556	4,702,294

CLASS 156

64	4,702,783
89	4,702,784
91	4,702,785
154	4,702,786
244.25	4,702,787
252	4,702,788
256	4,702,789
293	4,702,790
614	4,702,791
628	4,702,792
629	4,702,793
643	4,702,794
	4,702,795
653	4,702,796
	4,702,797

CLASS 157

1	4,702,295

CLASS 159

47.1	4,702,798
48.1	4,702,799

CLASS 160

107	4,702,296
271	4,702,297

CLASS 162

300	4,702,800

CLASS 164

137	4,702,298
	4,702,299
154	4,702,300
168	4,702,301
463	4,702,302
467	Re.32,529
491	4,702,303
529	4,702,304

CLASS 165

12	4,702,305
36	4,702,306
42	4,702,307
76	4,702,308
104.31	4,702,309
154	4,702,310
162	4,702,311

179 4,702,312

CLASS 166

216 4,702,313
245 4,702,314
249 4,702,315
272 4,702,316
4,702,317
274 4,702,318
275 4,702,319
343 4,702,320
350 4,702,321

CLASS 169

28 4,702,322

CLASS 172

156 4,702,323

CLASS 173

39 4,702,324
64 4,702,325
104 4,702,326

CLASS 174

23 C 4,703,132
35 GC 4,703,133
106 SC 4,703,134
135 4,703,135
152 G 4,703,136

CLASS 175

4 4,702,327
320 4,702,328

CLASS 177

211 4,702,329

CLASS 180

6.2 4,702,330
9.32 4,702,331
127 4,702,332
140 4,702,333
142 4,702,334
4,702,335
197 4,702,336
4,702,337
219 4,702,338
4,702,339
224 4,702,340
249 4,702,341
333 4,702,342

CLASS 181

106 4,702,343
121 4,702,344
129 4,702,345
207 4,702,346

CLASS 182

8 4,702,347
42 4,702,348
90 4,702,349

CLASS 185

39 4,702,350

CLASS 188

71.4 4,702,351
79.5 GC 4,702,357
79.62 4,702,352
135 4,702,353
196 D 4,702,354
285 4,702,355
315 4,702,356

CLASS 192

13 R 4,702,358
56 R 4,702,359
58 B 4,702,360
98 4,702,361
4,702,362
150 4,702,363

CLASS 193

22 4,702,364

CLASS 198

461 4,702,365
509 4,702,366
550.9 4,702,367

CLASS 200

50 AA 4,703,137
61.58 R 4,703,138
76 4,703,139
83 P 4,703,140
340 4,703,141

CLASS 203

1 4,702,801

CLASS 204

28 4,702,802
59 R 4,702,803
73 R 4,702,804
95 4,702,805
106 4,702,806
133 4,702,807
157.41 4,702,808
157.63 4,702,809
182.4 4,702,810
206 4,702,811
208 4,702,812
290 R 4,702,813
299 R 4,702,814
302 4,702,815
406 4,702,816

CLASS 206

45.24 4,702,368
312 4,702,369
328 4,702,371
331 4,702,370
387 4,702,372
389 4,702,373
392 Re.32,530
418 4,702,374
434 4,702,375
524.8 4,702,376
557 4,702,377
581 4,702,378
624 4,702,407

CLASS 208

28 4,702,817
81 4,702,818
354 4,702,819
390 4,702,487
424 4,702,820

CLASS 209

166 4,702,821
4,702,822
4,702,823
167 4,702,824
224 4,702,825
237 4,702,826
539 4,702,379

CLASS 210

117 4,702,827
131 4,702,828
195.2 4,702,829
220 4,702,830
236 4,702,831
242.3 4,702,832
321.72 4,702,835
321.78 4,702,834
333.01 4,702,833
500.23 4,702,836
512.3 4,702,837
638 4,702,838
4,702,839
4,702,840
4,702,841
651 4,702,842
733 4,702,844
784 4,702,845
788 4,702,846
798 4,702,847

CLASS 211

57.1 4,702,380
105.2 4,702,381
134 4,702,382

CLASS 215

232 4,702,383
295 4,702,384

CLASS 219

10.55 C 4,703,147
10.55 E 4,703,148
4,703,149
69 M 4,703,142
69 P 4,703,144
69 R 4,703,145
69 W 4,703,143
4,703,146
78.12 4,703,159
90 4,703,158
121 LU 4,703,157
136 4,703,156
271 4,703,155
345 4,703,154
370 4,703,152
4,703,153
518 4,703,151
535 4,703,150

CLASS 220

18 4,702,385
86 R 4,702,386
270 4,702,387
305 4,702,388
306 4,702,389
453 4,702,390
456 4,702,391

CLASS 221

151 4,702,392

CLASS 222

1 4,702,393
77 4,702,394
109 4,702,395
152 4,702,396
211 4,702,397
386 4,702,398
390 4,702,399
402.2 4,702,400

CLASS 224

42.03 B 4,702,401
277 4,702,402

CLASS 225

96.5 4,702,403

CLASS 226

7 4,702,404

CLASS 228

2 4,702,405
200 4,702,406

CLASS 229

101 4,702,408
125 4,702,409
184 4,702,410

CLASS 232

35 4,702,411

CLASS 235

1 D 4,703,160
4,703,161
379 4,703,162
382 4,703,163
384 4,703,164
487 4,703,165

CLASS 236

46 R 4,702,412
4,702,413

CLASS 239

4 4,702,414
8 4,702,415
11 4,702,416
98 4,702,417
101 4,702,418
333 4,702,419
391 4,702,420

CLASS 241

15 4,702,421
24 Re.32,531
46.06 4,702,422
60 4,702,423
101.7 4,702,424
156 4,702,425
167 4,702,426

CLASS 242

35.5 A 4,702,427
67.2 4,702,428
71.8 4,702,429
84.5 A 4,702,430
4,702,431
4,702,432
118.1 4,702,433
198 4,702,434

CLASS 244

3.13 4,702,435
17.11 4,702,437
104 FP 4,702,438
158 A 4,702,439
158 R 4,702,440
204 4,702,441
216 4,702,442
328 4,702,436

CLASS 248

51 4,702,443
56 4,702,444
100 4,702,445
210 4,702,446
231.5 4,702,447
231.7 4,702,448
288.3 4,702,449
292.1 4,702,450
309.1 4,702,451
317 4,702,452
447.2 4,702,453
585 4,702,454

CLASS 249

79 4,702,455
165 4,702,456

CLASS 250

201 4,703,166
203 R 4,703,167
207 4,703,168
211 J 4,703,169
211 R 4,703,170
221 4,703,171
223 R 4,703,172
227 4,703,173
4,703,174
4,703,175
231 SE 4,703,176
327.2 4,703,177
334 4,703,179
425 4,703,180
442.1 4,703,181
458.1 4,703,182
492.2 4,703,183
504 R 4,703,184
548 4,703,185
566 4,703,186
571 4,703,187

CLASS 251

161 4,702,457

CLASS 252

8.551 4,702,848
8.554 4,702,849
48.2 4,702,850
49.6 4,702,851
62.54 4,702,852
70 4,702,853
75 4,702,854
4,702,855
170 4,702,856
174.21 4,702,857
174.24 4,702,858
511 4,702,859
4,702,860
601 4,702,861
628 4,702,862

CLASS 254

97 4,702,458

CLASS 256

19 4,702,459

CLASS 260

351.5 Re.32,535
396 N 4,702,863
402.5 4,702,864

CLASS 264

17 4,702,865
25 4,702,867
46.4 4,702,866
50 4,702,868
65 4,702,869
87 4,702,870
101 4,702,871
114 4,702,872
135 4,702,873
171 4,702,874
177.13 4,702,875
184 4,702,876
553 4,702,877

CLASS 266

45 4,702,460
216 4,702,461
225 4,702,462

CLASS 267

64.26 4,702,463

CLASS 269

55 4,702,464
77 4,702,512
328 4,702,465

CLASS 271

10 4,702,466
133 4,702,467
195 4,702,468
227 4,702,469
229 4,702,470
284 4,702,471

CLASS 272

76 4,702,472
117 4,702,473
122 4,702,474

CLASS 273

1 E 4,702,476
1 GC 4,702,475
80 C 4,702,477
127 B 4,702,478
148 R 4,702,479
384 4,702,480

CLASS 277

116.2 4,702,481
165 4,702,482
212 FB 4,702,483

CLASS 279

1 S 4,702,484
19.4 4,702,485

CLASS 280

255 4,702,486
426 4,702,488
479 A 4,702,489
707 4,702,490
4,702,843
801 4,702,491
4,702,492
808 4,702,493
4,702,494
814 4,702,495

CLASS 281

15 R 4,702,496

CLASS 285

55 4,702,498
112 4,702,499
4,702,500
197 4,702,501
231 4,702,502
330 4,702,503

CLASS 290

38 B 4,703,188
44 4,703,189

CLASS 292

66 4,702,504
251 4,702,505
251.5 4,702,506

CLASS 294

66.1 4,702,507
101 4,702,508

CLASS 296

1 S 4,702,509
35.3 4,702,510
57 R 4,702,511
97 H 4,702,513
146 4,702,514
189 4,702,515
190 4,702,516
214 4,702,517
217 4,702,518

CLASS 297

185 4,702,519
417 4,702,520
440 4,702,521
452 4,702,522
485 4,702,523

CLASS 299

64 4,702,524
79 4,702,525

CLASS 301

6 WB 4,702,526
9 DN 4,702,527
99 4,702,528

CLASS 303

9.62 4,702,529
10 4,702,530
114 4,702,531
115 4,702,532

CLASS 307

2 4,703,190
64 4,703,191
4,703,192
66 4,703,193
116 4,703,194
147 4,703,195
246 4,703,196
264 4,703,199
279 4,703,200
290 4,703,201
443 4,703,202
446 4,703,203
448 4,703,204
450 4,703,205
465 4,703,206
473 4,703,198
646 4,703,197

CLASS 310

11 4,703,207
49 R 4,703,208
67 R 4,703,209
154 4,703,210
179 4,703,211
218 4,703,212
316 4,703,213
328 4,703,214
4,703,215
338 4,703,216
4,703,217
348 4,703,218

CLASS 312

12 4,702,533
114 4,702,534
308 4,702,535
330 R 4,702,536

CLASS 313

111 4,703,219
112 4,703,220
332 4,703,221
362.1 4,703,222
414 4,703,223
487 4,703,224
587 4,703,225
595 4,703,226
634 4,703,227

CLASS 315

5.41 4,703,234
149 4,703,228
169.4 4,703,229
364 4,703,230
366 4,703,231
370 4,703,232
398 4,703,233

CLASS 318

254 4,703,235
4,703,236
483 4,703,237
563 4,703,238
578 4,703,239
587 4,703,240
599 4,703,241
685 4,703,242
696 4,703,243
4,703,244
809 4,703,245
4,703,246

CLASS 320

13 4,703,247

CLASS 323

300 4,703,248
316 4,703,249
317 4,703,250

CLASS 324

57 R 4,703,251
62 4,703,252
65 CR 4,703,253
4,703,254
4,703,255
71.3 4,703,256
73 R 4,703,257
4,703,258
95 4,703,259
158 R 4,703,260
207 4,703,261
208 4,703,262
216 4,703,263
220 4,703,264
232 4,703,265
249 4,703,266
307 4,703,267
309 4,703,268
4,703,269
4,703,270
4,703,271
311 4,703,272
314 4,703,273
318 4,703,274
4,703,275
319 4,703,276
323 4,703,277
344 4,703,278
366 4,703,279
439 4,703,280

CLASS 328

28 4,703,281

CLASS 329

50 4,703,282

CLASS 330

9 4,703,283
259 4,703,284
260 4,703,285

CLASS 331

117 FE 4,703,286

CLASS 332

7.51 4,703,287

CLASS 333

1 4,703,288
1.1 4,703,289
195 4,703,290
202 4,703,291

CLASS 334

15 4,703,292

CLASS 335

80 4,703,293
121 4,703,294
129 4,703,295
208 4,703,296
222 4,703,297

CLASS 337

102 4,703,298
158 4,703,299
164 4,703,300
367 4,703,301

CLASS 338

293 4,703,302

CLASS 340

47 4,703,303
52 R 4,703,304
310 CP 4,703,306
347 DA 4,703,308
4,703,310
347 DD 4,703,311
347 P 4,703,309
347 SY 4,703,307
506 4,703,312
550 4,703,313
619 4,703,314
689 4,703,315
706 4,703,316
723 4,703,317
4,703,319
731 4,703,320
747 4,703,321
750 4,703,322
784 4,703,305
790 4,703,323
825.14 4,703,324
825.17 4,703,325
870.16 4,703,326

CLASS 342

44 4,703,327

CLASS 343

704 4,703,328

CLASS 346

24 4,703,329
75 4,703,330
140 R 4,703,331
4,703,332
4,703,333
160 4,703,334
723 4,703,318

CLASS 350

96.1 4,702,546
96.15 4,702,547
4,702,549
96.16 4,702,550
96.2 4,702,547
96.20 4,702,551
96.25 4,702,552
96.29 4,702,553
96.30 4,702,554
247 4,702,555
320 4,702,556
330 4,702,557
4,702,558
331 R 4,702,559
333 4,702,560
349 4,702,561
350 R 4,702,562
351 4,702,563
4,702,564
357 4,702,566
427 4,702,567
464 4,702,568
479 4,702,569
516 4,702,570
4,702,571
531 4,702,565
639 4,702,572

CLASS 351

161 4,702,573
162 4,702,574
210 4,702,575
214 4,702,576

CLASS 352

191 4,702,577

CLASS 354

15 4,702,578
21 4,702,579
106 4,702,580
126 4,702,581
331 4,702,582
400 4,702,583
4,702,584
410 4,702,585

CLASS 355

3 R 4,702,586
4,702,587
10 4,702,588
14 C 4,702,590
14 SH 4,702,589
15 4,702,591
53 4,702,592
77 4,702,593

CLASS 356

35.5 4,702,594
39 4,702,595
126 4,702,596
138 4,702,597
343 4,702,598
350 4,702,599
4,702,600
4,702,601
4,702,602
351 4,702,603
361 4,702,604
375 4,702,605
401 4,702,606
432 4,702,607

CLASS 357

30 4,703,336
4,703,337
72 4,703,338
81 4,703,339

CLASS 358

19 4,703,340
31 4,703,341
4,703,342
36 4,703,343
60 4,703,344
74 4,703,345
75 4,703,346
102 4,703,347
133 4,703,348
4,703,349
4,703,350
135 4,703,351
4,703,352
140 4,703,353
148 4,703,354
149 4,703,355
160 4,703,356
166 4,703,357
167 4,703,358
194.1 4,703,359
214 4,703,360
260 4,703,361
263 4,703,362
284 4,703,363
285 4,703,364
293 4,703,365
335 4,703,366
339 4,703,367
342 4,703,368
343 4,703,369

CLASS 360

10.2 4,703,370
75 4,703,371
96.1 4,703,372
97 4,703,373
98 4,703,374
105 4,703,375
4,703,376
106 4,703,377
113 4,703,378
118 4,703,379
121 4,703,380
123 4,703,381
125 4,703,382
126 4,703,383
132 4,703,384

CLASS 361

16 4,703,385
56 4,703,386
79 4,703,387
91 4,703,388
93 4,703,389
101 4,703,390
240 4,703,391
402 4,703,392
405 4,703,393
413 4,703,394
417 4,703,395
419 4,703,396
428 4,703,397

CLASS 362

61 4,703,398
66 4,703,399
80 4,703,400
4,703,401
102 4,703,402
268 4,703,403
294 4,703,404
333 4,703,405
365 4,703,406

CLASS 363

16 4,703,407
45 4,703,409
56 4,703,410
57 4,703,411

CLASS 364

140 4,703,412
147 4,703,413
4,703,414
4,703,415
170 4,703,416
200 4,703,417
4,703,418
4,703,419
4,703,420
4,703,421
4,703,422
400 4,703,423
414 4,703,424
419 4,703,425
421 4,703,426
422 4,703,427
424.1 4,703,428
426 4,703,429
431.05 4,703,430
470 4,703,431
4,703,432
481 4,703,448
485 4,703,433
488 4,703,434
489 4,703,435
490 4,703,436
498 4,703,437
519 4,703,438
521 4,703,439
4,703,440
4,703,442
526 4,703,441
559 4,703,443
561 4,703,444
4,703,445
580 4,703,446
724 4,703,447
900 4,703,449
4,703,450
4,703,451
4,703,452

CLASS 365

104 4,703,453
154 4,703,454
174 4,703,455
185 4,703,456
189 4,703,457
4,703,458

CLASS 366

146 4,702,608
184 4,702,609
213 4,702,610
325 4,702,611

CLASS 367

25 4,703,459
31 4,703,460
83 4,703,461
92 4,703,462
147 4,703,463
156 4,703,464

CLASS 368

10 4,702,612
66 4,702,613
72 4,702,614
82 4,702,615
223 4,702,616

CLASS 369

30 4,703,465
44 4,703,408
4,703,467
4,703,468
45 4,703,466
101 4,703,469
215 4,703,470

CLASS 370

1 4,703,471
3 4,703,472
15 4,703,473
18 4,703,474
60 4,703,475
76 4,703,476
94 4,703,477
4,703,478
104 4,703,479
111 4,703,480

CLASS 371

12 4,703,481
16 4,703,482
24 4,703,483
25 4,703,484
37 4,703,485
41 4,703,486

CLASS 372

33 4,703,487
44 4,703,488
64 4,703,489
86 4,703,490
93 4,703,491

CLASS 373

91 4,703,492
95 4,703,493

CLASS 374

109 4,702,617
121 4,702,618
144 4,702,619
145 4,702,620

CLASS 375

19 4,703,494

CLASS 376

249 4,702,878
282 4,702,879
305 4,702,880
442 4,702,881
446 4,702,882
4,702,883

CLASS 377

108 4,703,495

CLASS 378

99 4,703,496

CLASS 379

22 4,703,497
70 4,703,498
194 4,703,499
252 4,703,500

CLASS 380

28 4,703,503
59 4,702,497

CLASS 381

10 4,703,501
24 4,703,502
51 4,703,504
4,703,505
92 4,703,506
94 4,703,507
188 4,703,508
191 4,703,509
196 4,703,510

CLASS 382

13 4,703,511
22 4,703,512
27 4,703,513
41 4,703,514
46 4,703,515
56 4,703,516

CLASS 383

7 4,703,517
63 4,703,518
97 4,703,519

CLASS 384

37 4,702,621
44 4,702,622
45 4,702,623
294 4,702,624
428 4,702,625
477 4,702,626
526 4,702,627
580 4,702,628

CLASS 400

56 4,702,629
82 4,702,630
208 4,702,631
639.1 4,702,632

CLASS 401

34 4,702,633
53 4,702,634

CLASS 403

15 4,702,635
24 4,702,636
373 4,702,637
403 4,702,638

CLASS 404

10 4,702,639
75 4,702,640
97 4,702,641
118 4,702,642
121 4,702,643
128 4,702,644

CLASS 405

154 4,702,645
169 4,702,646
4,702,647
224 4,702,648

CLASS 407

119 4,702,649

CLASS 408

6 4,702,650
226 4,702,651

CLASS 409

84 4,702,652

CLASS 410

144 4,702,653

CLASS 411

31 4,702,654
43 4,702,655
60 4,702,656
369 4,702,657
426 4,702,658

CLASS 412

4 4,702,659

CLASS 414

95 4,702,660
460 4,702,661
477 4,702,662
618 4,702,663
676 4,702,664
730 4,702,665
4,702,666
735 4,702,667
744 R 4,702,668
747 Re.32,532
749 4,702,669

CLASS 415

116 4,702,670
134 4,702,671
164 4,702,672

CLASS 416

215 4,702,673

CLASS 417

44 4,702,674
63 4,702,675
87 4,702,676
222 4,702,677
360 4,702,678
475 4,702,679
490 4,702,680

CLASS 418

55 4,702,681
4,702,682
4,702,683
259 4,702,684

CLASS 419

8 4,702,884
23 4,702,885

CLASS 420

18 4,702,886
442 4,702,887

CLASS 422

50 4,702,888
103 4,702,889
133 4,702,890
140 4,702,891
171 4,702,892
173 4,702,893
186.26 4,702,894

CLASS 423

54 4,702,895
167 4,702,896
213.5 4,702,897
220 4,702,898
244 4,702,899
345 4,702,900
346 4,702,901
350 4,702,902
359 4,702,903

CLASS 424

52 4,702,904
57 4,702,905
70 4,702,906
88 4,702,907
4,702,908
89 4,702,909
92 4,702,910
4,702,911
95 4,702,912
4,702,913
195.1 4,702,914
4,702,915
400 4,702,916
422 4,702,917
461 4,702,918
480 4,702,919

CLASS 425

182 4,702,685
190 4,702,686
227 4,702,687
450.1 4,702,688
459 4,702,920
548 4,702,689

CLASS 426

48 4,702,921
51 4,702,922
61 4,702,923
92 4,702,924
96 4,702,925
283 4,702,926
467 4,702,927
607 4,702,928
635 4,702,929

CLASS 427

2 4,702,930
10 4,702,931
33 4,702,932
34 4,702,933
39 4,702,934
42 4,702,935
54.1 4,702,936
132 4,702,938
244 4,702,940
250 4,702,941
259 4,702,942
282 4,702,943
389.8 4,702,944

CLASS 428

1 4,702,945
36 4,702,946
4,702,947
40 4,702,948
92 4,702,949
95 4,702,950
193 4,702,951
4,702,952
209 4,702,953
213 4,702,954
4,702,955
251 4,702,956
288 4,702,957
323 4,702,958
4,702,959
367 4,702,960
379 4,702,961
418 4,702,962
426 4,702,963
447 4,702,964
457 4,702,965
500 4,702,966
620 4,702,967
623 4,702,968
635 4,702,969
688 4,702,970

CLASS 429

31 4,702,971
34 4,702,972
41 4,702,973
50 4,702,974
100 4,702,975
181 4,702,976
194 4,702,977
218 4,702,978

CLASS 430

52 4,702,979
63 4,702,980
69 4,702,981
72 4,702,982
75 4,702,983
115 4,702,984
4,702,985
120 4,702,986
122 4,702,987
137 4,702,988
4,702,989
197 4,702,990
270 4,702,991
272 4,702,992
296 4,702,993
306 4,702,994
311 4,702,995
325 4,702,996
4,702,997
430 4,702,998
445 4,702,999
493 4,703,000

CLASS 431

187 4,702,691
346 4,702,692
348 4,702,693

CLASS 432

133 4,702,694
154 4,702,695
205 4,702,696

CLASS 433

173 4,702,697

CLASS 434

2 4,702,698
20 4,702,699
168 4,702,700
270 4,702,701
278 4,702,702
289 4,702,703
295 4,702,704

CLASS 435

5 4,703,001
17 4,703,002
68 4,703,003
4,703,004
4,703,005
161 4,703,007
172.3 4,703,009
173 4,703,010
236 4,703,011
240.2 4,703,008

CLASSIFICATION OF PATENTS

320 4,703,012

CLASS 436

12 4,703,013
42 4,703,014
74 4,703,015
86 4,703,016
501 4,703,017
518 4,703,018

CLASS 437

5 4,701,997
31 4,701,998
44 4,701,996
63 4,702,000
129 4,701,995
4,702,781
211 4,701,999
233 4,702,937

CLASS 439

15 4,702,705
69 4,702,706
80 4,702,707
83 4,702,708
144 4,702,709
152 4,702,537
271 4,702,543
4,702,710
292 4,702,538
304 4,702,541
347 4,702,542
371 4,702,540
395 4,702,544
546 4,702,711
588 4,702,539
596 4,702,712
856 4,702,545

CLASS 440

7 4,702,713

61 4,702,714

CLASS 441

80 4,702,715

CLASS 445

26 4,702,716
27 4,702,717

CLASS 446

175 4,702,718
227 4,702,719
448 4,702,720

CLASS 455

75 4,703,520

CLASS 464

67 4,702,721
93 4,702,722
120 4,702,723
172 4,702,724

CLASS 474

28 4,702,725
101 4,702,726
4,702,727
148 4,702,728
205 4,702,729

CLASS 493

56 4,702,730
196 4,702,731

CLASS 501

13 4,703,019
86 4,703,020
87 4,703,021
95 4,703,022
102 4,703,023

103 4,703,024

CLASS 502

60 4,703,025
119 4,703,026
171 4,703,027
178 4,703,028
243 4,703,029
338 4,703,030
339 4,703,031
413 4,703,032

CLASS 503

204 4,703,335

CLASS 514

11 4,703,033
4,703,034
12 4,703,035
15 Re.32,534
18 4,703,036
19 4,703,037
4,703,038
21 4,703,039
23 4,703,040
4,703,041
56 4,703,042
80 4,703,043
159 4,703,045
202 4,703,046
254 4,703,047
255 4,703,048
258 4,703,049
277 4,703,050
291 4,703,051
292 4,703,044
337 4,703,052
382 4,703,053
386 4,703,054
400 4,703,055

414 4,703,056
432 4,703,057
471 4,703,058
493 4,703,059
549 4,703,060
551 4,703,061
552 4,703,062
603 4,703,063

CLASS 518

700 4,703,064

CLASS 521

57 4,703,065
60 4,703,066
63 4,703,067
150 4,703,068
174 4,703,069

CLASS 523

102 4,703,070
403 4,703,071

CLASS 524

99 4,703,072
4,703,073
262 4,703,074
269 4,703,075
420 4,703,076
462 4,703,077
476 4,703,078
495 4,703,079
555 4,703,080
592 4,703,081
731 4,703,082

CLASS 525

87 4,703,083
4,703,084
91 4,703,085

133 4,703,086
161 4,703,087
189 4,703,088
245 4,703,089
246 4,703,090
332.3 4,703,091
351 4,703,092
387 4,703,093

CLASS 526

65 4,703,094
247 4,703,095
248 4,703,096
279 4,703,097
283 4,703,098

CLASS 528

54 4,703,099
66 4,703,100
87 4,703,101
125 4,703,102
179 4,703,103
211 4,703,104
483 4,703,105

CLASS 530

307 4,703,106
330 4,703,107
356 4,703,108

CLASS 534

15 4,703,109
566 4,703,110
637 4,703,111
642 4,703,112
796 4,703,113

CLASS 536

4.1 4,703,114
55 4,703,115

104 4,703,116
114 4,703,117

CLASS 540

224 4,703,118
544 4,703,119

CLASS 544

278 4,703,120
317 4,703,121
319 4,703,122

CLASS 546

345 4,703,123
352 4,703,124

CLASS 548

126 4,703,125
508 4,703,126

CLASS 549

214 4,703,127
270 4,703,128
368 4,703,129

CLASS 558

169 4,703,130

CLASS 604

20 4,702,732
34 4,702,733
54 4,702,734
161 4,702,735
180 4,702,736
191 4,702,737
198 4,702,738
4,702,739
323 4,702,740

CLASS 623

599 4,702,218

CLASSIFICATION OF DESIGNS

D2— 25 292,440
265 292,441
315 292,442
320 292,443
330 292,444
D3— 40 292,445
44 292,446
D4— 104 292,447
292,448
116 292,449
122 292,450
D6— 333 292,451
335 292,452
292,453
292,454
292,455
389 292,456

469 292,457
484 292,458
500 292,459
601 292,460
608 292,461
D7— 5 292,462
292,463
9 292,464
292,465
306 292,466
292,467
309 292,468
350 292,469
354 292,470
360 292,471
292,472
402 292,473

D8— 1 292,474
292,475
14 292,476
21 292,477
33 292,478
40 292,479
71 292,480
74 292,481
302 292,482
D9— 341 292,483
370 292,484
375 292,485
394 292,486
432 292,487
443 292,488
447 292,489
292,490

292,491
453 292,492
D10— 57 292,493
292,494
64 292,495
79 292,496
92 292,497
120 292,498
D11— 2 292,499
26 292,500
61 292,501
81 292,502
D12— 124 292,503
156 292,504
169 292,505
211 292,506
292,507

306 292,508
316 292,509
317 292,510
292,511
D13— 11 292,512
D14— 53 292,513
76 292,514
100 292,515
D15— 89 292,516
D18— 30 292,517
292,518
D20— 5 292,519
D21— 41 292,520
77 292,521
212 292,522
D22— 107 292,523

126 292,524
D24— 1.1 292,526
17 292,527
56 292,528
64 292,529
67 292,530
D26— 85 292,525
87 292,531
D32— 49 292,532
53.1 292,533
58 292,534
66 292,535
69 292,536
73 292,537
D34— 27 292,538
D99— 29 292,539

CLASSIFICATION OF PLANTS

P.— 34 6,043

38 6,044

43 6,045

88 6,046

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,702,896	4,702,415	4,703,206	4,703,519	4,702,698	4,703,080
04 : 4,701,991	4,702,416	4,703,207	09 : 4,702,002	4,702,736	4,703,083
4,702,147	4,702,422	4,703,216	4,702,162	4,702,782	4,703,084
4,702,220	4,702,439	4,703,228	4,702,164	4,702,889	4,703,092
4,702,373	4,702,448	4,703,251	4,702,190	4,702,911	4,703,140
4,702,425	4,702,481	4,703,252	4,702,233	4,702,967	4,703,147
4,702,437	4,702,495	4,703,272	4,702,247	4,703,042	4,703,263
4,702,824	4,702,509	4,703,273	4,702,376	4,703,423	4,703,289
4,702,941	4,702,537	4,703,274	4,702,398	4,703,484	4,703,354
4,702,969	4,702,543	4,703,279	4,702,466	4,703,505	4,703,421
4,703,161	4,702,552	4,703,313	4,702,474	4,703,507	4,703,452
4,703,390	4,702,563	4,703,314	4,702,538	4,703,517	4,703,475
4,703,405	4,702,564	4,703,319	4,702,540	13 : Re.32,531	4,703,510
4,703,455	4,702,569	4,703,327	4,702,592	4,702,012	18 : 4,701,962
4,703,458	4,702,578	4,703,330	4,702,603	4,702,058	4,701,967
05 : 4,702,640	4,702,593	4,703,355	4,702,608	4,702,198	4,702,124
06 : 4,701,965	4,702,614	4,703,356	4,702,715	4,702,228	4,702,137
4,702,028	4,702,650	4,703,368	4,702,912	4,702,403	4,702,174
4,702,031	4,702,655	4,703,371	4,702,942	4,702,597	4,702,265
4,702,052	4,702,657	4,703,375	4,703,052	4,702,641	4,702,335
4,702,056	4,702,658	4,703,376	4,703,099	4,702,710	4,702,459
4,702,094	4,702,668	4,703,377	4,703,171	4,702,950	4,702,477
4,702,101	4,702,703	4,703,404	4,703,189	16 : 4,702,062	4,702,510
4,702,105	4,702,706	4,703,406	4,703,229	4,702,507	4,702,523
4,702,110	4,702,716	4,703,412	4,703,235	4,703,217	4,702,528
4,702,115	4,702,733	4,703,418	4,703,264	17 : 4,701,966	4,702,645
4,702,121	4,702,735	4,703,433	4,703,277	4,701,973	4,702,660
4,702,140	4,702,738	4,703,436	4,703,287	4,701,975	4,702,754
4,702,142	4,702,761	4,703,439	4,703,309	4,701,976	4,703,058
4,702,145	4,702,773	4,703,444	4,703,312	4,701,984	4,703,118
4,702,154	4,702,787	4,703,447	4,703,333	4,701,999	4,703,233
4,702,159	4,702,851	4,703,448	4,703,389	4,702,051	4,703,286
4,702,194	4,702,856	4,703,467	4,703,434	4,702,166	4,703,306
4,702,205	4,702,951	4,703,470	4,703,460	4,702,251	4,703,341
4,702,226	4,702,963	4,703,473	10 : 4,702,985	4,702,275	4,703,387
4,702,231	4,703,001	4,703,481	4,703,018	4,702,358	4,703,399
4,702,235	4,703,008	4,703,485	4,703,068	19 : 4,702,389	4,702,066
4,702,238	4,703,013	4,703,486	4,703,098	4,702,452	4,702,274
4,702,240	4,703,030	4,703,487	4,703,303	4,702,456	4,702,297
4,702,244	4,703,035	4,703,491	11 : 4,702,059	4,702,476	4,702,323
4,702,256	4,703,103	4,703,495	12 : 4,702,000	4,702,525	4,702,520
4,702,259	4,703,133	4,703,498	4,702,060	4,702,551	4,702,611
4,702,266	4,703,159	4,703,513	4,702,096	4,702,724	4,702,642
4,702,277	4,703,163	08 : 4,702,098	4,702,225	4,702,740	4,702,828
4,702,279	4,703,170	4,702,253	4,702,241	4,702,865	20 : 4,702,165
4,702,315	4,703,175	4,702,348	4,702,255	4,702,892	4,702,409
4,702,321	4,703,176	4,702,457	4,702,290	4,702,897	4,702,467
4,702,329	4,703,179	4,702,653	4,702,357	4,702,924	4,702,539
4,702,343	4,703,181	4,702,690	4,702,374	4,702,943	21 : 4,702,016
4,702,353	4,703,195	4,702,853	4,702,388	4,702,966	4,702,296
4,702,365	4,703,197	4,703,139	4,702,393	4,702,973	4,702,717
4,702,385	4,703,199	4,703,457	4,702,504	4,703,024	22 : 4,702,009
4,702,397	4,703,205	4,703,463	4,702,575	4,703,031	4,702,325

4,702,375
4,702,827
4,702,832
23 : 4,702,049
4,702,877
24 : 4,702,023
4,702,223
4,702,260
4,702,381
4,702,734
4,702,884
4,703,016
4,703,173
4,703,331
25 : 4,702,015
4,702,026
4,702,073
4,702,102
4,702,113
4,702,170
4,702,369
4,702,396
4,702,418
4,702,542
4,702,576
4,702,732
4,702,748
4,702,814
4,702,933
4,702,960
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4,703,062
4,703,183
4,703,224
4,703,238
4,703,276
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4,703,318
4,703,322
4,703,329
4,703,349
4,703,350
4,703,417
4,703,449
4,703,478
26 : 4,702,027
4,702,033
4,702,037
4,702,100
4,702,111
4,702,125
4,702,127
4,702,304
4,702,355
4,702,363
4,702,407
4,702,471
4,702,484
4,702,491
4,702,505
4,702,519
4,702,522
4,702,594
4,702,701
4,702,721
4,702,741
4,702,753
4,702,768
4,702,822
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4,702,902
4,702,931
4,702,955
4,702,974
4,703,053
4,703,105
4,703,158
4,703,198
4,703,237
4,703,336
4,703,386
4,703,419
27 : 4,701,968
4,702,035
4,702,055
4,702,061
4,702,108
4,702,169
4,702,224
4,702,237
4,702,269
4,702,270
4,702,305
4,702,364
4,702,413
4,702,478
4,702,489
4,702,496
4,702,544
4,702,561
4,702,659
4,702,783
4,702,793
4,702,920
4,703,148
28 : 4,703,040
29 : 4,702,243
4,702,261
4,702,322
4,703,300
30 : 4,702,786
31 : 4,703,497
33 : 4,702,340
4,703,462
34 : 4,701,964
4,701,995
4,702,184
4,702,308
4,702,316
4,702,318
4,702,319
4,702,380
4,702,390
4,702,402
4,702,434
4,702,500
4,702,508
4,702,512
4,702,697
4,702,763
4,702,777
4,702,798
4,702,808
4,702,817
4,702,850
4,702,891
4,702,905
4,702,914
4,702,916
4,702,925
4,702,946
4,702,956
4,702,957
4,702,961
4,702,993

4,703,009
4,703,025
4,703,037
4,703,043
4,703,070
4,703,091
4,703,096
4,703,108
4,703,109
4,703,116
4,703,120
4,703,132
4,703,166
4,703,168
4,703,172
4,703,220
4,703,288
4,703,307
4,703,340
4,703,357
4,703,416
4,703,442
4,703,474
4,703,477
4,703,508
4,703,514
35 : 4,702,901
4,703,156
36 : 4,701,983
4,701,996
4,701,998
4,702,029
4,702,041
4,702,048
4,702,074
4,702,109
4,702,129
4,702,141
4,702,192
4,702,273
4,702,291
4,702,309
4,702,383
4,702,384
4,702,438
4,702,451
4,702,453
4,702,475
4,702,497
4,702,574
4,702,580
4,702,605
4,702,620
4,702,649
4,702,662
4,702,671
4,702,673
4,702,693
4,702,696
4,702,792
4,702,804
4,702,807
4,702,834
4,702,840
4,702,868
4,702,898
4,702,907
4,702,908
4,702,947
4,702,954
4,702,975
4,702,996
4,703,002
4,703,073
4,703,082
4,703,115

4,703,130
4,703,165
4,703,243
4,703,267
4,703,280
4,703,325
4,703,400
4,703,403
4,703,409
4,703,435
4,703,471
4,703,476
4,703,515
4,703,518
37 : 4,701,963
4,701,970
4,702,091
4,702,092
4,702,264
4,702,406
4,702,429
4,702,766
4,702,917
4,703,017
4,703,323
38 : 4,702,573
4,702,643
4,702,861
39 : 4,702,006
4,702,042
4,702,053
4,702,119
4,702,130
4,702,215
4,702,287
4,702,289
4,702,292
4,702,298
4,702,328
4,702,368
4,702,386
4,702,387
4,702,408
4,702,411
4,702,412
4,702,445
4,702,502
4,702,516
4,702,644
4,702,700
4,702,737
4,702,774
4,702,799
4,702,813
4,702,826
4,702,857
4,702,976
4,703,022
4,703,071
4,703,079
4,703,275
4,703,407
40 : Re.32,533
4,702,345
4,702,691
4,702,815
4,702,821
4,702,849
4,702,899
4,703,081
4,703,088
4,703,191
4,703,192
4,703,459
41 : 4,702,054
4,702,065

4,702,200
4,702,547
4,702,838
4,703,285
4,703,316
4,703,372
4,703,410
42 : 4,701,969
4,702,025
4,702,176
4,702,181
4,702,230
4,702,254
4,702,312
4,702,324
4,702,359
4,702,392
4,702,447
4,702,450
4,702,480
4,702,499
4,702,501
4,702,536
4,702,541
4,702,595
4,702,664
4,702,694
4,702,707
4,702,749
4,702,757
4,702,825
4,702,864
4,702,878
4,702,879
4,702,880
4,702,882
4,702,883
4,702,887
4,702,895
4,702,971
4,702,984
4,703,010
4,703,034
4,703,065
4,703,085
4,703,089
4,703,101
4,703,362
4,703,395
4,703,396
4,703,451
43 : 4,703,499
44 : 4,703,464
45 : Re.32,530
4,702,881
4,703,315
46 : 4,702,893
47 : 4,702,122
4,702,134
4,702,149
4,702,179
4,702,443
4,702,479
4,702,617
4,702,875
4,703,093
4,703,359
48 : 4,702,005
4,702,018
4,702,086
4,702,093
4,702,118
4,702,143
4,702,168
4,702,178

4,702,199
4,702,310
4,702,313
4,702,314
4,702,317
4,702,320
4,702,327
4,702,342
4,702,344
4,702,446
4,702,458
4,702,465
4,702,488
4,702,534
4,702,571
4,702,572
4,702,647
4,702,692
4,702,709
4,702,712
4,702,758
4,702,795
4,702,819
4,702,843
4,702,848
4,702,926
4,703,011
4,703,027
4,703,123
4,703,174
4,703,203
4,703,221
4,703,278
4,703,321
4,703,420
4,703,426
4,703,520
49 : 4,702,021
4,702,046
4,703,461
50 : 4,702,131
4,703,142
51 : 4,702,112
4,702,610
4,702,687
4,702,713
4,703,392
4,703,503
4,703,511
53 : 4,702,268
4,702,441
4,702,442
4,702,770
4,702,886
4,703,004
4,703,131
54 : 4,703,064
55 : 4,702,003
4,702,036
4,702,090
4,702,132
4,702,136
4,702,202
4,702,401
4,702,514
4,702,524
4,702,634
4,702,638
4,702,870
4,703,155
4,703,424
4,703,465
4,703,496
56 : 4,702,747
4,702,888

DESIGN PATENTS

04 : 292,516
05 : 292,440
292,510
06 : 292,444
292,447
292,460
292,462
292,463
292,464
292,466
292,467
292,473

292,517
292,518
292,527
09 : 292,536
292,539
10 : 292,487
292,533
12 : 292,511
292,514
292,515
292,524
13 : 292,446

15 : 292,479
17 : 292,468
292,478
292,519
292,523
18 : 292,449
292,500
24 : 292,502
26 : 292,456
292,458
292,465
292,506

292,507
27 : 292,475
292,520
29 : 292,441
292,481
33 : 292,512
34 : 292,484
292,488
292,528
35 : 292,461
36 : 292,483
292,525

292,531
292,532
37 : 292,495
39 : 292,482
292,489
292,490
292,491
292,492
292,521
41 : 292,443
292,476
42 : 292,480

45 : 292,485
292,501
47 : 292,474
48 : 292,442
292,457
292,522
49 : 292,499
51 : 292,535
53 : 292,451
292,493
292,494
55 : 292,450

PLANT PATENTS

06 : 6,044
6,045
12 : 6,046
41 : 6,043

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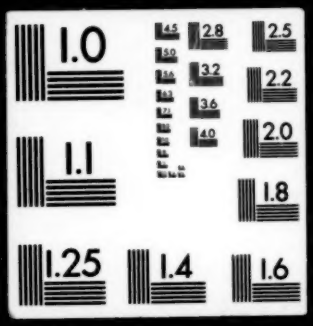
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